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# Assessment of Alternative Funding Models for Activities in RDECOM (Now CCDC) and ATEC

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# Preface

This report documents research and analysis conducted as part of a project entitled *Assessment of Alternative Funding Models for Activities in RDECOM and ATEC*, sponsored by the Office of the Deputy Chief of Staff, G-8, U.S. Army. The purpose of the project was to assess alternative ways to fund the U.S. Army Research, Development and Engineering Command (RDECOM)[1] and Army Test and Evaluation Command (ATEC).

This research was conducted with RAND Arroyo Center's Forces and Logistics Program. RAND Arroyo Center, part of the RAND Corporation, is a federally funded research and development center (FFRDC) sponsored by the United States Army.

RAND operates under a "Federal-Wide Assurance" (FWA00003425) and complies with the *Code of Federal Regulations for the Protection of Human Subjects Under United States Law* (45 CFR 46), also known as "the Common Rule," as well as with the implementation guidance set forth in Department of Defense (DoD) Instruction 3216.02. As applicable, this compliance includes reviews and approvals by RAND's Institutional Review Board (the Human Subjects to Protection Committee) and by the U.S. Army. The views of sources utilized in this study are solely their own and do not represent the official policy or position of DoD or the U.S. Government.

[1] This research was conducted between March 2017 and April 2018. In February 2019, RDECOM was renamed the Combat Capabilities Development Command (CCDC) as it transitioned from Army Materiel Command to Army Futures Command. Subordinate organizations were also renamed.

# Table of Contents

# Figures

# Tables

# Summary

In August 2016, the Office of the Under Secretary of Defense (Comptroller) (OUSD[C]) asked the military departments to minimize reimbursable civilian personnel costs, which would increase the transparency of accounting practices and improve auditability. Reimbursable activities are funded by charging customers for the costs of the services they receive. Customers who typically receive appropriations pay the prices set by the provider for the services provided through transfers of funding and other accounting procedures. The prices charged include combinations of direct and indirect costs of providing the service to the customer.

The OUSD(C) guidance focuses on minimizing reimbursables because they make transactions between organizations less transparent and harder to trace as funding is transferred from one organization to another. Reimbursables can also potentially result in double counting of funding, since both the customer and supplier are obligating the same funds (e.g., the customer obligates funds to the supplier, then the supplier obligates the funds to execute the work, such as to payments to civilian personnel).

In response to the OUSD(C) request, the Office of the Deputy Chief of Staff, G-8, U.S. Army asked RAND Arroyo Center to evaluate alternative approaches to funding the activities of the Army Research, Development, and Engineering Command (RDECOM) and the Army Test and Evaluation Command (ATEC), both of which rely to a large extent on reimbursables.

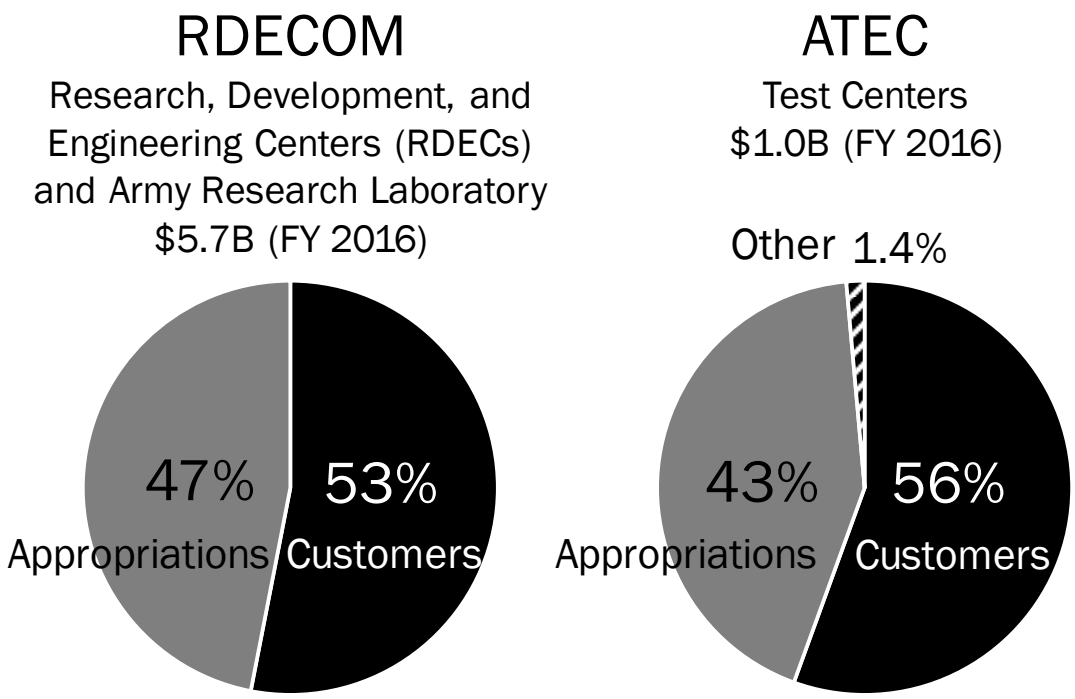
## Methodology

The study team conducted numerous visits and had discussions with personnel across the commands throughout the study to learn about and obtain data on their reimbursable practices. The study team also visited and had discussions with the commands' customers and stakeholders across the Army to understand concerns about these reimbursable practices, as well as other commands across the Department of Defense (DoD) to understand how they fund similar activities. RAND Arroyo Center identified a set of criteria against which funding models should be evaluated and used those criteria to assess funding models currently used at RDECOM and ATEC as well as several alternative funding models. In addition, the study team conducted three detailed analyses to inform this assessment. First, RAND Arroyo Center asked Deloitte—an audit and assurance, consulting, risk and financial advisory, risk management, and tax firm—to perform an assessment of the funding models being considered by the commands and provide financial statement auditability considerations for the different funding mechanisms. In addition, the study team identified the steps necessary to transition to alternative funding models and estimated prices under alternative funding models.

## Current Funding Models

Both RDECOM and ATEC's test centers fund their activities through a combination of customer funding and institutional funding from appropriations (see Figure S.1). On average, both commands receive over half their funding from customers. However, the two commands use different funding models—that is, they use different sets of rules about who pays for what costs.

**Figure S.1. Fiscal Year 2016 (FY 2016) Funding Sources at RDECOM and ATEC**



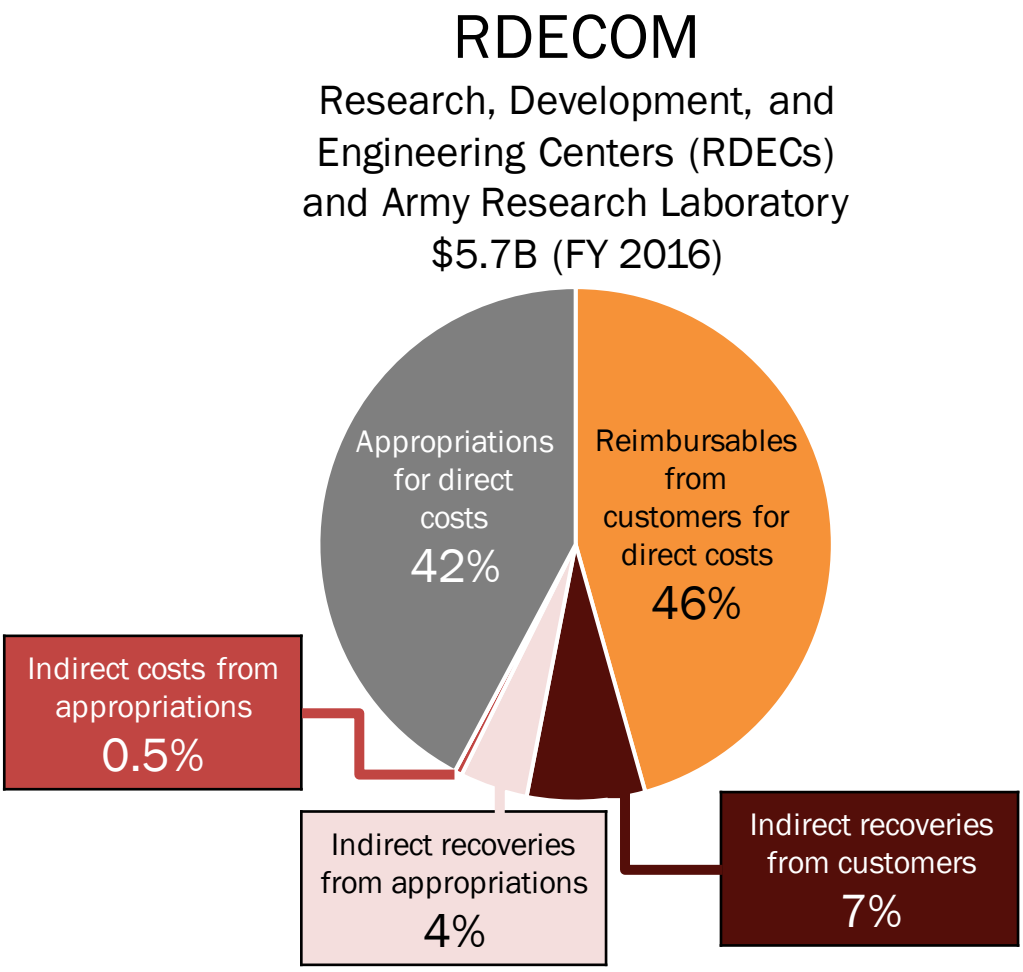

SOURCES: RAND Arroyo Center analysis of ATEC General Fund Enterprise Business System (GFEBS) expense data; and RDECOM summary of obligations for FY 2016.

RDECOM and ATEC have two major cost categories. "Direct costs" are costs closely linked to a specific effort or customer. "Indirect costs," which are sometimes also called "overhead," are costs organizations cannot link to specific efforts or customers.

### *RDECOM's Current Funding Model*

RDECOM uses a funding model we call "(near) full cost recovery," where RDECOM receives funding for direct costs through reimbursables from customers or appropriations and "taxes" them with indirect rates to pay for most of their indirect costs. Figure S.2 breaks down the direct and indirect costs paid by appropriations, reimbursables from customers, and recoveries.

**Figure S.2. FY 2016 Funding Profiles at RDECOM**

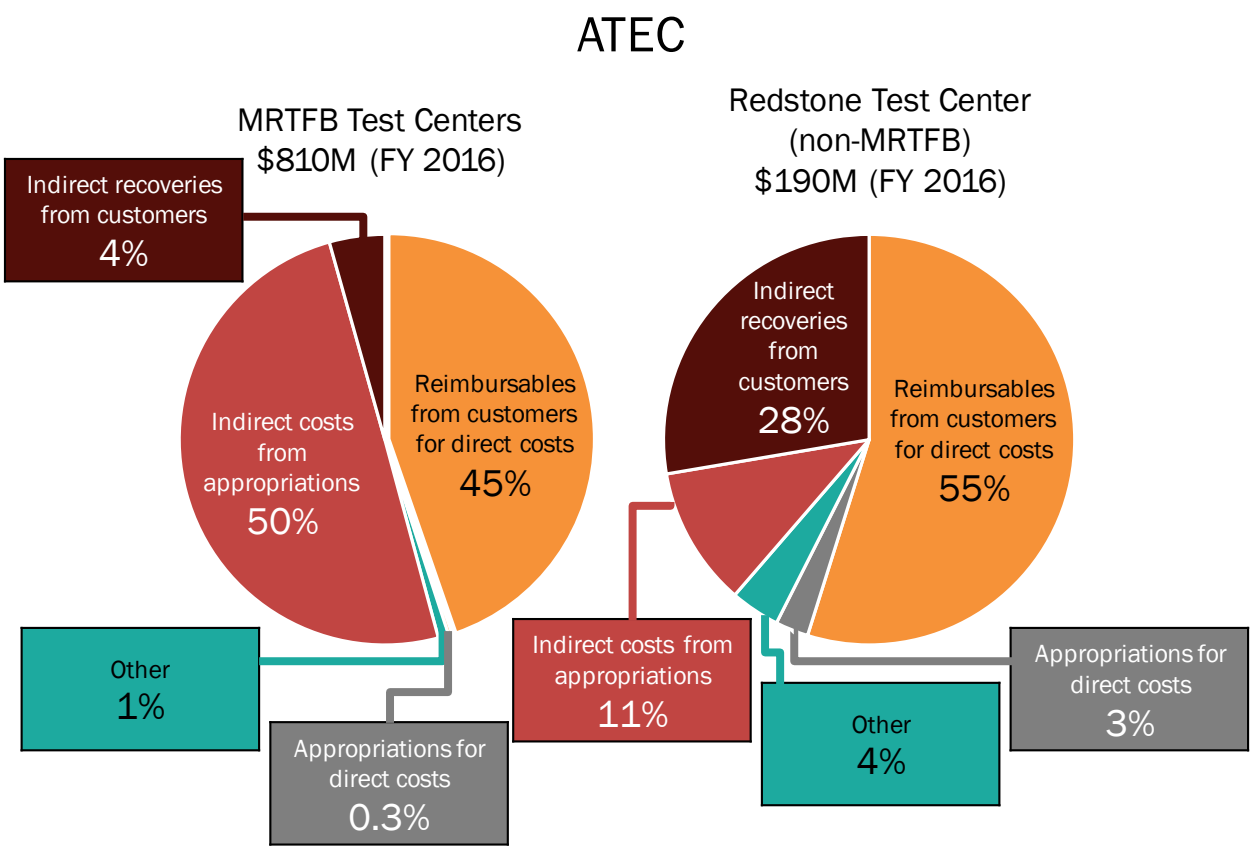



SOURCE: RAND Arroyo Center analysis of RDECOM summary of obligations for FY 2016.

### *ATEC's Current Funding Models*

ATEC's test centers follow two different funding models (see Figure S.3). ATEC's Major Range and Test Facility Base (MRTFB) test ranges, by law, must comply with an "appropriations for indirect costs" model, where customers pay for direct costs but indirect costs are paid through appropriations. Since MRTFBs are restricted by law from recovering indirect costs from most of their customers, they rely mainly on appropriations to fund indirect costs. ATEC's non-MRTFB test capabilities, concentrated at Redstone Test Center (RTC), follow a (near) full cost recovery model like RDECOM; they recover most of their funding for indirect costs from indirect rates charged to customers. ATEC's non-MRTFB capabilities also obtain a relatively large share of their funding (at least compared to RDECOM) from ATEC's appropriations.

**Figure S.3. FY 2016 Funding Profiles at ATEC**

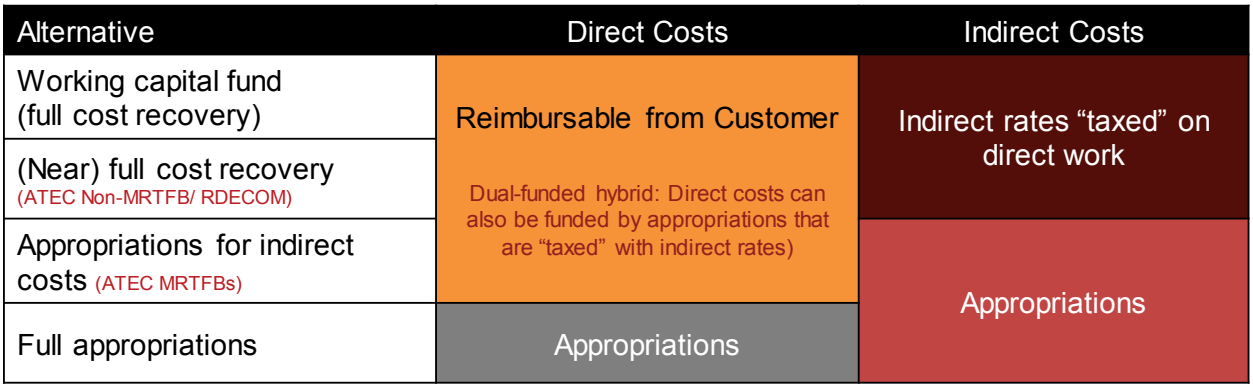



SOURCE: RAND Arroyo Center analysis of ATEC GFEBS expense data for FY 2016.
NOTE: MRTFB is Major Range and Test Facility Base.

## Potential Funding Models

Based on discussions with other DoD labs and test centers, the study team identified and considered in detail two other alternative funding models: a full cost recovery working capital fund (WCF) model and a full appropriations model where RDECOM and ATEC would pay all costs using their appropriations. The four models the study team evaluated in detail are shown in Figure S.4. The models vary by whether customers pay for direct costs of their efforts and whether customers are taxed indirect rates to pay for the suppliers' indirect costs. Real-world policies can blend different models and features together. For example, RDECOM is a dual-funded hybrid of (near) full cost recovery because it receives funding from both customers and appropriations to fund direct costs then taxes both the customers and the appropriations to pay for indirect costs. Further, as shown in Figure S.2, RDECOM receives a small amount of appropriations to fund its indirect costs.

**Figure S.4. Funding Models Evaluated**




WCF models are like (near) full cost recovery models, but the DoD subjects WCF organizations to standards in pricing, cost recovery, and reporting. WCF organizations offer customers stabilized prices set in advance of a fiscal year. WCF policies encourage suppliers to pass all direct and most indirect costs on to customers. Finally, WCF organizations use DoD standard reporting templates to report their finances.

## Assessment of Funding Models

RAND Arroyo Center assessed the funding models using a variety of criteria chosen in consultation with the sponsor, commands, and stakeholders. As discussed in the introduction, the OUSD(C) concerns about financial issues and accounting provided an impetus for this study. According to Deloitte, all models are *potentially* auditable, but those models requiring reimbursement from customers require greater supplier effort to be auditable. Along with financial and accounting considerations, the study team's assessment considered how the various funding models impact suppliers, customers, and the Army. Funding models do not exist in a vacuum—they can lead suppliers and customers to change behavior in ways that may or may not be desirable to the Army.

## Recommended Funding Models

Table S.1 provides a summary of the study team's recommendations about funding models. *RAND Arroyo Center recommends improving the current funding models at RDECOM and ATEC by implementing improvements to accounting and business practices.*

**Table S.1. Summary of Recommendations**

| Alternative | RDECOM | ATEC MRTFB Test Capabilities | ATEC Non-MRTFB Test Capabilities |
|---|---|---|---|
| Working capital fund | Feasible but has drawbacks | Not feasible: Requires policy/law change | Feasible for RTC but has substantial drawbacks |
| (Near) full cost recovery | Recommended: Reform current practices | Not feasible: Requires policy/law change | Recommended: Reform current practices |
| Appropriations for indirect costs | Feasible but has drawbacks | Recommended: Reform current practices | Feasible but has drawbacks |
| Full appropriations | Inappropriate for customer-supplier relationships | | |

### *Research, Development, and Engineering Command (RDECOM)*

RAND Arroyo Center recommends that RDECOM continue to operate within the (near) full cost recovery model. It is a model that has the potential to be responsive to customers yet has the flexibility to accept appropriations, and this enables it to engage in activities beneficial to the Army, such as conducting research with a long-term payoff. RDECOM is an adaptive organization that shifts priorities and divests of obsolescent capabilities, and (near) full cost recovery pricing comes closest to offering proper incentives to customers and suppliers.

Over the last several years, RDECOM has helped develop the Army Materiel Command (AMC) Concept of Operations (CONOPS), which standardizes how costs are treated throughout the command. Over time, RDECOM's implementation of the CONOPS has increased the appropriateness of RDECOM's indirect rates; namely, they treat customers more equitably and ensure costs are legitimate and follow Army and DoD financial policy. However, the implementation of the CONOPS has also increased the complexity of RDECOM's indirect rates, thereby reducing customer and stakeholder transparency—that is, understanding of indirect rates and the indirect costs they fund. This turbulence will likely smooth over time as customers and stakeholders become more familiar with the CONOPS.

The largest benefit of the WCF is that it provides a standard set of processes and governance, whereas the AMC CONOPS applies to AMC only. Transitioning to the WCF would create a risk of death spirals as price increases led to decreases in demand. RAND Arroyo Center estimates average prices at RDECOM could increase by about 17 percent under the WCF. Another risk of the WCF is to RDECOM's appropriations for mission activities, which help them grow capabilities. Under the WCF, these appropriations would be reallocated to customers who may be more focused on executing research at the lowest price than on investing in the future.

The main benefit of appropriations for indirect costs is that it would likely reduce many of the concerns customers have about the transparency and appropriateness of indirect costs. However, it would not necessarily reduce Army concerns since the Army would still need to

fund those costs using appropriations. Oversight from Headquarters, Department of the Army (HQDA) for indirect costs may be more effective at creating supplier incentives for efficiency than oversight from customers who have little visibility, but improvements can be made to increase HQDA oversight in the current funding model. Appropriations for indirect costs would introduce some risk that RDECOM might not be able to obtain necessary indirect resources. For example, RDECOM's workload might grow, but appropriations might not. Appropriations for indirect costs would better support the sustainment of underutilized capabilities—but given RDECOM's focus on science and technology (S&T), incentives to divest of unneeded capabilities and invest in cutting-edge capabilities, which (near) full cost recovery provides, are probably more prudent.

RAND Arroyo Center found full appropriations is inappropriate for customer-supplier relationships like those in RDECOM and ATEC. Full appropriations excels over reimbursables in financial and accounting issues. However, its deficiencies make it inappropriate for customer-supplier relationships. Full appropriations provides services to customers for "free," and this reduces the incentives for customers and suppliers to behave efficiency and effectively. Customers have an incentive to overdemand services, leading suppliers to ration their services. Suppliers have fewer incentives to be responsive to customer needs. Another serious drawback of full appropriations is that it would reduce the adaptability of RDECOM and ATEC to changes in demand from customers. Resources for full appropriations must be budgeted well in advance of the fiscal year, whereas customer workload is often not known until the year of execution.

### *ATEC's Major Range and Test Facility Bases (MRTFBs)*

RAND Arroyo Center recommends ATEC's MRTFBs continue to use the appropriations for indirect costs model. It is the only reimbursable model consistent with current law. Appropriations for indirect costs supports the long-term sustainment of underutilized capabilities, better ensuring that Army test capabilities are available for programs requiring them. ATEC's test centers generally have a one-size-fits-all approach where all capabilities within a test center are designated as inside or outside the MRTFB. This all-or-nothing designation of MRTFBs can create risks to highly utilized capabilities because ATEC cannot ask customers for additional funding for investments. Customers of highly utilized capabilities could potentially benefit from those capabilities being moved outside the MRTFB, but this removal would require policy changes.

Section 232 of the FY 2003 National Defense Authority Act (NDAA) would have to be repealed to move ATEC's MRTFBs to (near) full cost recovery or the WCF. Either (near) full cost recovery or the WCF would shift ATEC's incentives from the sustainment of test capabilities necessary over the long run toward divestment of lesser needed capabilities that impose high indirect costs and would raise prices for customers. Even if MRTFBs do not charge capital investment costs to customers, there could still be a significant risk of death spirals since

test capabilities require high levels of indirect spending for sustainment. RAND Arroyo Center estimates significant increases in prices in the WCF (nearly a 200 percent increase at ATEC's MRTFBs). In the short run, divestment of MRTFB capabilities could lower the Army's costs, but in the long run it could be costly if the Army had to reconstitute test capabilities or was unable to conduct tests, increasing risks to programs.

Even if Section 232 of the FY 2003 NDAA were repealed, (near) full cost recovery for all the MRTFBs is unattractive because it would increase ATEC's reimbursables—contrary to OUSD(C) guidance—and would do little to solve other accounting issues at ATEC. Further, it could increase prices significantly (an increase of more than 130 percent, by the study team's estimates) that would create a risk of death spirals.

Finally, as discussed above, RAND Arroyo Center found full appropriations is inappropriate for customer-supplier relationships.

### *ATEC Non-Major Range and Test Facility Base (MRTFB)*

RAND Arroyo Center recommends ATEC's non-MRTFB capabilities remain in (near) full cost recovery. As at RDECOM, (near) full cost recovery is a model with flexible rules that can incentivize suppliers to be responsive to customers and to divest of unneeded capabilities. (Near) full cost recovery has the flexibility to provide appropriations to suppliers that can help cover fixed costs and charge customers prices closer to marginal cost.

Non-MRTFB capabilities are not governed by MRTFB policies; hence the Army has greater flexibility to choose a funding model than it does with ATEC's MRTFBs. Shifting non-MRTFB capabilities located at MRTFB ranges to the WCF is unlikely to be feasible since they are such a small share of the workload at those ranges. The WCF is likely to be feasible at RTC. The chief benefit of the WCF over (near) full cost recovery is it would move these capabilities to a standardized set of processes and governance common across the DoD, which can help increase transparency. There are several potential drawbacks of moving RTC into the WCF. Most notably, the WCF possesses less flexible rules regarding nonreimbursable funding sources—RTC receives about $10 million each year in appropriations supporting its indirect operations plus additional appropriations for capability investments. RAND Arroyo Center estimates that RTC's prices would increase by about 70 percent if moved to the WCF, and this would increase the risk of death spirals and incentivize divestment in capabilities the Army benefits from in the long term. Another significant downside of the WCF is that RTC is a small share of ATEC, a command possessing no WCF experience. It may not be worthwhile to incur the transition costs of shifting only a single range into the WCF.

Moving ATEC's non-MRTFB activities to appropriations for indirect costs is a feasible option, but the Army has chosen to keep RTC and other non-MRTFB test capabilities outside the MRTFB, who would impose this funding model. The MRTFB seeks to preserve unique capabilities while military departments have more flexibility to divest of non-MRTFB capabilities. Appropriations for indirect costs would reduce reimbursable funding, but major

drawbacks include the risk that appropriations for indirect costs would not be responsive to the needs of the range's customers and a potential reduction in incentives to spending indirect funding efficiently.

## Recommended Improvements in Accounting Methods

RAND Arroyo Center recommends that RDECOM and ATEC pursue improvements to their current funding models that would allow them to address stakeholder financial and accounting concerns without the drawbacks and risks of alternative funding models.

Several of the recommended improvements focus on improving the transparency of indirect rates at RDECOM and ATEC's non-MRTFB capabilities. Indirect rates inherently lack transparency because suppliers charge indirect rates to customers to pay for costs that do not directly benefit those customers. The study team found that this lack of transparency was a primary source of customer frustration, so improvements to transparency would address a major criticism of reimbursable funding.

Some of the recommended improvements address ways to increase the consistency of financial policies. Another source of customer frustration is a belief that different customers are treated differently. The study team identified some instances where policies, even when applied consistently across customers, could result in inconsistent costs. As an example, RDECOM does not tax contractor costs with indirect rates, so projects with many contractors tend to be cheaper than projects primarily staffed with Army civilians.

Many of the improvements the study team recommends at RDECOM would extend the progress RDECOM has made in increasing the transparency and appropriateness of their indirect rates practices during the implementation of the AMC CONOPS. ATEC can also apply several of these improvements, especially at RTC. Furthermore, the study recommends that RTC adopt elements of the AMC CONOPS to increase standardization of reimbursable practices across the Army.

## Remaining Challenges

The study team identified several remaining challenges. Most notably, the study team found the Army has been developing an alternative to reimbursement called direct charge that would increase the Army's compliance with the OUSD(C) guidance while permitting RDECOM and ATEC to continue using customers' funding. However, direct charge has significant drawbacks, and these have prevented the Army from adopting the practice. If the Army can identify improvements in its financial systems and reporting processes that address these drawbacks, then the Army can increase the use of direct charge and increase compliance with the OUSD(C) guidance.

Although this study identified transition steps and costs of transitioning to a new funding model, if the Army decides to adopt a new model, then more precision will be needed in planning

transition tasks and estimating costs. The study team's estimates are of a rough order of magnitude and make many assumptions that could be improved by additional analysis. The Army will need to execute a significant transition effort to make detailed decisions about implementation that will require negotiation between different organizations in the Army. These negotiations will take time and add uncertainty to this planning.

# Acknowledgments

The study team wishes to thank our sponsor, Dr. David Markowitz, assistant deputy chief of staff, G-8, U.S. Army, and his staff. In particular, Matthew Chesney provided support throughout the study. Davis Welch, deputy director of the Army Budget Office, provided financial perspectives, and Bryan Sapp of the Army Budget Office provided deep knowledge of the Army Working Capital Fund. John Daniels, Deputy Assistant Secretary of the Army for Plans, Programs, and Resources in the Office the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) provided customer perspectives, and Louis Tutt was instrumental in our interactions with the commands' customers. Donald Tison, former assistant deputy chief of staff, G-8, U.S. Army, provided useful feedback and ideas throughout the study. Wesley Miller, Deputy Assistant Secretary of the Army for Financial Operations, and his staff (Myrna Medina, in particular) met with us frequently to provide feedback and keep us up to date on Army policy.

Susan Goodyear, G-8 at Army Materiel Command, met with us frequently and helped us meet with experts throughout her command. The staff at RDECOM and ATEC were especially helpful for giving us their time and providing us with data to conduct the study. Justin Johnson, the deputy to the G-8 at RDECOM, and Sandara Weaver, G-8 at ATEC, were especially helpful at answering our questions, arranging visits, and providing us with data. Mark Gaydos from ATEC helped educate us about GFEBS accounting and reviewed our data analyses.

We would like to thank all of the people with whom we met and held discussions throughout the course of the study. The organizations we met with are listed in the tables in Appendix O.

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# Abbreviations

| | |
|---|---|
| 3CT | Command Control Communications-Tactical |
| AAA | Army Audit Agency |
| ACC | Army Contracting Command |
| ACO | administrative contracting officer |
| ACT | Advanced Concepts Branch |
| AEC | Army Evaluation Command |
| AFLCMC | Air Force Life Cycle Management Center |
| AFMC | Air Force Materiel Command |
| AFRL | Air Force Research Laboratory |
| AFTC | Air Force Test Center |
| AMC | Army Materiel Command |
| AMRDEC | Aviation and Missile Research, Development, and Engineering Center |
| ANYT | Analytics Branch |
| AOR | accumulated operating result |
| APS | Army Prepositioned Stocks |
| ARDEC | Armament Research, Development, and Engineering Center |
| ARL | Army Research Laboratories |
| ARRG | Army Working Capital Fund Requirements Review Group |
| ASA(ALT) | Assistant Secretary of the Army (Acquisition, Logistics, and Technology) |
| ATAAPS | Automated Time, Attendance, and Production System |
| ATC | Aberdeen Test Center |
| ATEC | Army Test and Evaluation Command |
| AVN | Aviation |
| AWCF | Army Working Capital Fund |
| BA | Budget Activity |
| CASB | Cost Accounting Standards Board |
| CBO | Congressional Budget Office |

| | |
|---|---|
| CCDC | Combat Capabilities Development Command |
| CECOM | Communications-Electronics Command |
| CEFMS | Corps of Engineers Financial Management System |
| CERDEC | Communications-Electronics Research, Development, and Engineering Center |
| CHRA | Army Civilian Human Resources Agency |
| CIMS | Contractor Information Management System |
| CLS | common levels of support |
| COED | commitments, obligations, expenses, and disbursements |
| CONOPS | AMC General Funds Reimbursable Concept of Operations |
| CS&CSS | Combat Support and Combat Service Support |
| CSI | Center for Systems Integration Directorate |
| CTEIP | Central Test and Evaluation Investment Program |
| DAC | Department of the Army Civilian |
| DASA | Deputy Assistant Secretary of the Army |
| DASA-CE | Deputy Assistant Secretary of the Army for Cost and Economics |
| DAU | Defense Acquisition University |
| DCMA | Defense Contract Management Agency |
| DD | Directives Division |
| DFAS | Defense Finance and Accounting Service |
| DISA | Defense Information Systems Agency |
| DLH | direct labor hours |
| DoD | Department of Defense |
| DOE | Department of Energy |
| DOH | departmental overhead |
| DOT&E | Director of Operational Test and Evaluation |
| DSB | Defense Science Board |
| DUSA-T&E | Deputy Under Secretary of the Army for Test and Evaluation |
| ECBC | Edgewood Chemical Biological Center |
| EIB | expanded industrial base |
| EP | Engineer Pamphlets |
| EPG | electronic proving ground |
| ERDC | Engineer Research and Development Center |

| | |
|---|---|
| ERP | enterprise resource planning |
| FAD | Funds Authorization Document |
| FBR | Fast Burst Reactor |
| FFRDC | federally funded research and development center |
| FIAR | Financial Improvement and Audit Readiness |
| FIRE | Financial Integrated Reporting Environment |
| FMR | Financial Management Regulation |
| FMS | foreign military sales |
| FMSWeb | Force Management System Web Site |
| FTE | full-time equivalent |
| FY | fiscal year |
| G&A | general and administrative |
| GAO | Government Accountability Office |
| GCS | Ground Combat Systems |
| GFEBS | General Fund Enterprise Business System |
| GSES | Ground Systems Engineering Support Directorate |
| HQ | headquarters |
| HQDA | Headquarters, Department of the Army |
| IED | improvised explosive device |
| IMCOM | Army Installation Management Command |
| ISR | installation status report |
| JOCAS II | Job Order Cost Accounting System II |
| KSD | key supporting documentation |
| LCMC | Life Cycle Management Command |
| LMP | Logistics Modernization Program |
| MEDCOM | Army Medical Command |
| MIPR | Military Interdepartmental Purchase Request |
| MRTFB | Major Range and Test Facility Base |
| NAVAIR | Naval Air Systems Command |
| NAVSEA | Naval Sea Systems Command |
| NAWC | Naval Air Warfare Center |
| NAWCWD | Naval Air Warfare Center Weapons Division |

| | |
|---|---|
| NDAA | National Defense Authorization Act |
| NERP | Navy Enterprise Resource Planning |
| NETCOM | Army Network Enterprise Technology Command |
| NFNL | nonfacility/nonlabor |
| NMP | national maintenance program |
| NOR | net operating result |
| NRL | Naval Research Laboratory |
| NSRDEC | Natick Soldier Research, Development and Engineering Center |
| NSWC | Naval Surface Warfare Center |
| NUWC | Naval Undersea Warfare Center |
| NWCF | Navy Working Capital Fund |
| OMA | Operations and Maintenance, Army *or* O&M Army |
| OSD | Office of the Secretary of Defense |
| OTC | Operational Test Command |
| OUSD(C) | Office of the Under Secretary of Defense (Comptroller) |
| PBUSE | Property Book Unit Supply Enhanced |
| PE | Program Element |
| PEO | program executive office |
| PM | program manager |
| PM ITTS | Project Manager Instrumentation, Targets and Threat Simulators |
| POM | Program Objective Memorandum |
| PROBE | Program Optimization and Budget Evaluation |
| PST | Physical Simulation and Test Branch |
| PUIC | project unique identification code |
| RDEC | Research, Development, and Engineering Center |
| RDECOM | Research, Development, and Engineering Command |
| RDT&E | Research, Development, Test, and Evaluation |
| RM | resource management |
| RTC | Redstone Test Center |
| RTI | Research and Technology Integration Directorate |
| S&T | science and technology |
| SAE | service acquisition executive |

| | |
|---|---|
| SBIR | Small Business Innovation Research |
| SE | Systems Engineering Directorate |
| SPAWAR | Space and Naval Warfare Systems Command |
| SSC | SPAWAR Systems Center |
| STTR | Small Business Technology Transfer |
| T&E | test and evaluation |
| TACOM | Tank-automotive and Armaments Command |
| TARDEC | Tank Automotive Research, Development, and Engineering Center |
| TCS | test capabilities sustainment |
| TDA | table of distribution and allowances |
| TDAP | test development and acquisition plan |
| TPM | Technical Planning and Management Branch |
| TRMC | Test Resource Management Center |
| UCSR | Unfunded Civil Service Retirement |
| USACE | U.S. Army Corps of Engineers |
| USAF | U.S. Air Force |
| WBS | work breakdown structure |
| WCF | working capital fund |
| WDTC | West Desert Test Center |
| WES | Web-Enabled Services Branch |
| WSMR | White Sands Missile Range |
| WSTC | White Sands Test Center |
| YPG | Yuma Proving Ground |
| YTC | Yuma Test Center |

# 1. Introduction

## Motivation for the Study

In August 2016, the Office of the Under Secretary of Defense Comptroller (OUSD[C]) asked the military departments to increase the transparency of accounting practices and improve auditability by minimizing reimbursable civilian personnel costs. Reimbursable activities are funded by charging customers for the costs of the services. Customers, who typically receive appropriations, pay the prices that are set by the provider for the services and that are provided through transfers of funding and other accounting procedures. The prices charged include combinations of direct and indirect[1] costs of providing the service to the customer.

The OUSD(C) guidance focuses on minimizing reimbursables because they make transactions between organizations less transparent and harder to trace as funding is transferred from one organization to another. Reimbursables can potentially result in double counting of funding, since both the customer and supplier are obligating the same funds (e.g., the customer obligates funds to the supplier, then the supplier obligates the funds to execute the work, such as to pay civilian personnel).[2]

## Study Objective

In response to the OUSD(C) request, the Office of the Deputy Chief of Staff, G-8, U.S. Army, asked RAND Arroyo Center to evaluate alternative approaches to funding the activities of the Army Test and Evaluation Command (ATEC) and the Army Research, Development, and

[1] "Indirect costs are costs that cannot be identified specifically with or traced to a given cost object in an economically feasible way" (U.S. DoD, Financial Management Regulation [FMR], vol. 4 [190215]). "Indirect costs" are usually used synonymously with "overhead costs." For example, the Army Material Command (AMC) *General Funds Reimbursable Concept of Operations (CONOPS)* generally uses the term "indirect" but occasionally uses the term "overhead" synonymously. ATEC 37–11 (*U.S. Army Test and Evaluation Command Standard Rate Management*) often calls these costs "overhead (indirect)." Nevertheless, ATEC does charge a small amount of costs it labels as "overhead" costs directly to projects (we estimate this to be less than $4 million) when a function it deems as overhead can be directly identified to a single program. Some other definitions offer a more precise difference between the two types of cost. For example, the Naval Air Warfare Center defines production overhead and general and administrative as two types of indirect costs charged to customers.

[2] Several stakeholders were concerned with the potential for reimbursables to double count funding and were concerned about the difficulties of intra-Army eliminations (i.e., within Army transactions that must be removed from Army-wide financial statements because they have no effect on the Army's net position). However, nobody we spoke with cited any instances where double counting occurred.

Engineering Command (RDECOM), both of which rely to a large extent on reimbursement from customer accounts.[3]

## Study Approach

The study team conducted numerous visits and discussions with personnel across the commands throughout the study to learn about and obtain data on their reimbursable practices. The study team also visited and had discussions with the commands' customers and stakeholders across the Army and the Department of Defense (DoD) to understand concerns about these reimbursable practices as well as other commands across DoD to understand how they fund similar activities. Appendix O lists these visits and discussions. RAND Arroyo Center identified a set of criteria against which funding models should be evaluated and assessed current funding models against several alternative funding models for each command using those criteria. In addition, the study team conducted three detailed analyses to inform this assessment. First, RAND Arroyo Center asked Deloitte, an audit and assurance, consulting, risk and financial advisory, risk management, and tax firm, to perform an assessment of the funding models being considered by the commands and provide financial statement auditability considerations for the different funding mechanisms (summarized in Appendix H). The study team also identified the steps necessary to transition to alternative funding models (Appendix I) and estimated prices under alternative funding models (Appendix J).

## Overview of Findings and Recommendations

RAND Arroyo Center recommends that RDECOM and ATEC pursue improvements to their current funding models, as this would allow them to address stakeholder financial and accounting concerns without the drawbacks and risks of alternative funding models. RAND Arroyo Center found that two of the alternatives considered have significant drawbacks: the full appropriations model and the working capital fund (WCF).

The full appropriations model, which provides suppliers with funding to cover all costs without the need for any contributions from customers, would address most financial and accounting concerns raised by stakeholders and customers. However, full appropriations would severely jeopardize the performance of the commands because it would reduce their ability to pivot resources and adapt to changing customer and Army priorities, would provide services for "free" to customers leading to capacity shortfalls, and could cause suppliers to be less responsive to customer and Army needs.

[3] Operational Test Command (OTC) and Army Evaluation Command (AEC) are also within ATEC but were excluded from the scope of the study because they mainly fund civilian personnel with appropriations.

A WCF would provide a funding model with standards across DoD that is exempt from the Office of the Secretary of Defense (OSD) guidance to reduce reimbursables. However, it would be unlikely to address many stakeholders' financial and accounting concerns. Further, it would likely raise customer prices leading to customers reducing demand and suppliers divesting of capabilities. These price increases would be especially severe at ATEC's test ranges.

RAND Arroyo Center found that RDECOM could potentially move into the WCF or that the Army could increase appropriations to pay for RDECOM's indirect costs but that the costs and risks of such a change likely outweigh the benefits.

RAND Arroyo Center found that current laws and policy would severely constrain the Army's ability to shift ATEC's test ranges designated as Major Range and Test Facility Base (MRTFB) to an alternative funding model, such as the WCF, that relied more on reimbursements from customers. The Army has more flexibility to shift test capabilities not designated as MRTFB to other funding models; however, the only alternative model without significant drawbacks would fund non-MRTFB capabilities similarly to MRTFB capabilities, which is unlikely to be a desirable business model for the Army.

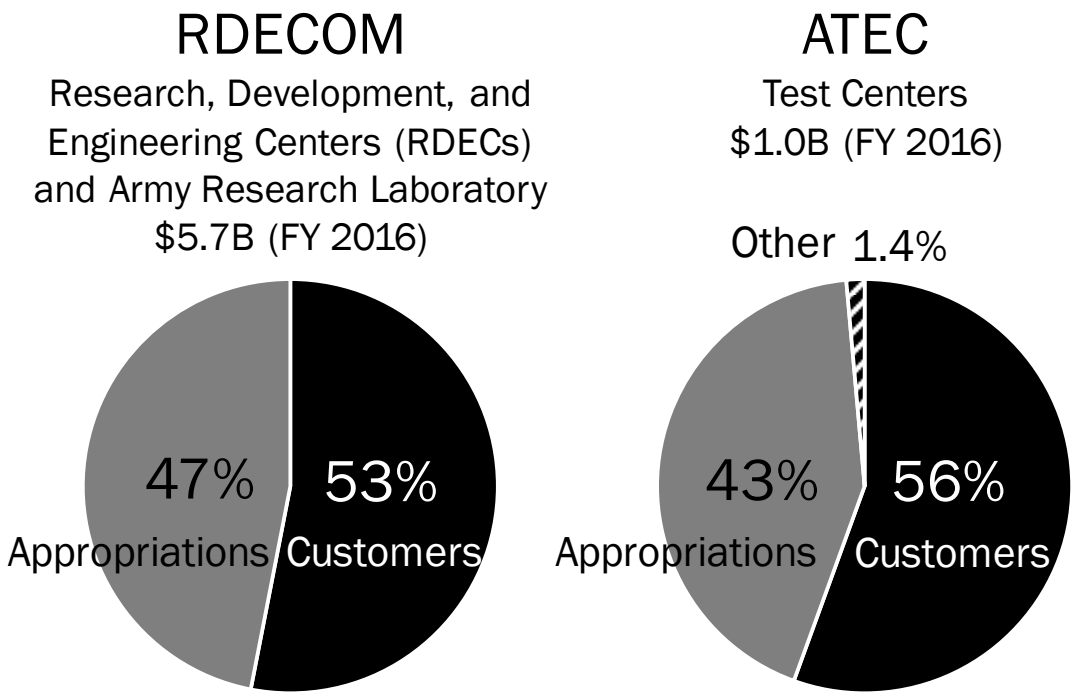
## Organization of This Report

Chapter 2 provides an overview of funding models used in RDECOM and ATEC. Chapter 3 reviews funding models that the study team identified as possible alternatives. Chapter 4 reviews the criteria that the study team used to assess the models across RDECOM and ATEC. Chapter 5 conducts those assessments and recommends that the commands improve the current system. Chapter 6 discusses improvements to RDECOM's and ATEC's accounting practices that the study team identified. Chapter 7 concludes with additional areas where RAND Arroyo Center recommends making improvements but where additional research is necessary. The appendices provide full details of the analyses. Appendix O lists the study team's visits and discussions.

# 2. Overview of Funding Models Used by RDECOM and ATEC

Both RDECOM and ATEC's test centers fund their activities through a combination of customer funding and institutional funding (from appropriations). Although both commands rely on customers for a little over half their funding (see Figure 2.1), the two commands fund their costs differently. This chapter provides an overview of the funding models used by RDECOM and ATEC.

**Figure 2.1. Fiscal Year 2016 (FY 2016) Funding Sources at RDECOM and ATEC**




SOURCES: RAND Arroyo Center analysis of ATEC General Fund Enterprise Business System (GFEBS) expense data and RDECOM summary of obligations for FY 2016.

## RDECOM Funding Model

This study considered funding models across RDECOM. RDECOM organizations are listed in Table 2.1, where we also indicate which parts of RDECOM were considered in our analysis.

**Table 2.1. RDECOM Organizations**

| Name | Description | Considered in Study |
|---|---|---|
| HQ Indirect[a] | RDECOM Headquarters Oversight/Management Activities | Partially[b] |
| HQ Mission[a] | RDECOM Headquarters Activities the Contribute Directly to Mission | Partially[b] |
| ARL | Army Research Laboratory | ✓ |
| AMRDEC | Aviation and Missile Research Development and Engineering Center | ✓ |
| ARDEC | Armament Research Development and Engineering Center | ✓ |
| CERDEC | Communication-Electronics Research Development and Engineering Center | ✓ |
| ECBC | Edgewood Chemical Biological Center | ✓ |
| NSRDEC | Natick Soldier Research Development and Engineering Center | ✓ |
| TARDEC | Tank Automotive Research Development and Engineering Center | ✓ |

[a] HQ RDECOM funding, which is mostly through appropriations, is not shown in Figure 2.1 but is shown in the detailed data throughout the appendices.
[b] Since HQ costs are currently funded mainly through appropriations, only the WCF model, whose policies require customer reimbursement for HQ costs, is considered as an alternative.

As Figure 2.2 shows, RDECOM organizations receive a small amount of funding for indirect expenses through appropriations. Otherwise RDECOM organizations are funded by customers (to conduct laboratory, research, or testing activities on their behalf or to provide matrixed engineering personnel to augment program managers' staff) or receive mission funding from a variety of appropriations (usually to conduct laboratory or research activities).

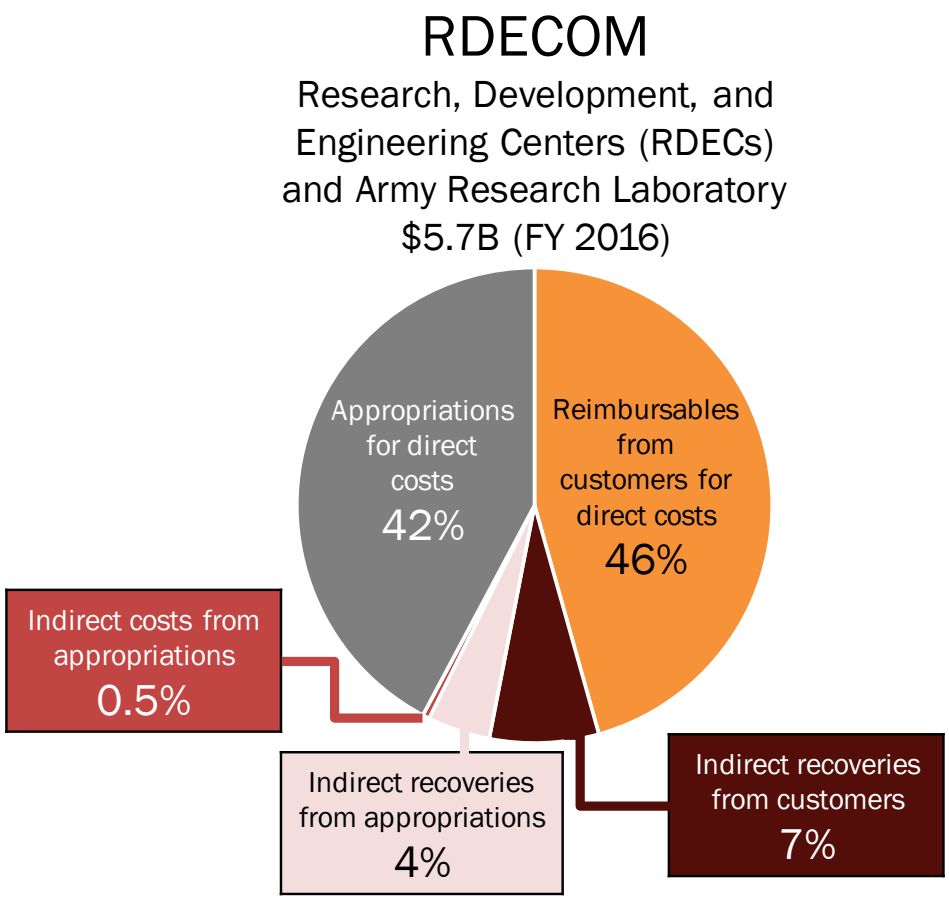
### *RDECOM's Indirect Cost Structure*

Under the Army Materiel Command (AMC) General Funds Reimbursable Concept of Operations (CONOPS) (U.S. Army Material Command, 2017) that AMC and RDECOM have been developing and implementing, indirect costs are funded through assessments to projects and are hence charged to customer reimbursable funds and appropriations.[1]

The AMC CONOPS defined a standardized indirect cost structure that RDECOM uses for all its organizations, except HQ. Each organization has two or three tiers of indirect cost pools that are funded through indirect rates charged to projects that benefit from indirect costs in the cost pool. The indirect rates that RDECOM charges are a dollar amount per direct labor hour worked by civilian personnel. RDECOM's goal for each indirect cost pool is for indirect costs paid by the pool to equal indirect recoveries from projects that are recovered using the indirect rates.

[1] Figure 2.2 is a snapshot of funding for a single year. Appendix A explores RDECOM's funding, costs, and cost accounting policies in depth and contains analysis that shows that the character of RDECOM's funding has not changed substantially over the past four years despite the introduction of the CONOPS. Appendix C outlines both commands' indirect budgeting process. Appendix D presents a case study of how the implementation of the AMC Reimbursable CONOPS impacted finances for one RDECOM organization.

**Figure 2.2. FY 2016 Funding Profiles at RDECOM**




SOURCE: RAND Arroyo Center analysis of RDECOM summary of obligations for FY 2016.

**Tier 1** indirect costs apply to the entire organization. It is functionally similar to the general and administrative (G&A) level of indirect cost pools used in WCF accounting. Thus, all projects subject to indirect rates pay the same Tier 1 indirect rate.

**Tier 2** indirect costs are indirect cost pools that apply only to a subset of an organization. Tier 2 cost pools often align to directorates of RDECOM's labs; thus, each directorate manages a pool of indirect funding recovered using indirect rates applied to the direct labor hours (DLH). Different tiers naturally have different costs; for example, directorates that manage a lot of laboratory equipment tend to have higher indirect costs than directorates whose personnel tend to work in office environments. Therefore, different Tier 2 cost pools possess unique indirect rates.

**Tier 3** indirect costs are an optional level of even greater detail. These indirect costs could be applied at the branch level (for example, see the detailed analysis of the Tank Automotive Research, Development, and Engineering Center's [TARDEC's] rate structure in Appendix A). They could also apply to a specific function, for example, if a team of personnel were applying a specific type of service.

When a civilian employee charges a project on their time card, the Army's financial management system—the General Fund Enterprise Business System (GFEBS)—automatically performs cost allocations[2] by charging indirect rates to the projects that transfer funds from the customer's or appropriation's funding to the appropriate indirect cost pools. At a minimum, there is a Tier 1 charge and a Tier 2 charge, with the potential for a Tier 3 charge if applicable.[3]

RDECOM organizations also charge a Section 219 recovery rate, which funds work in each organization's internally managed Section 219 program. The Section 219 program provides funds to DoD laboratories that they can use for activities such as laboratory-directed projects and investments. It is named after Section 219 of the Fiscal Year (FY) 2009 National Defense Authorization Act (NDAA), which allowed laboratories to use up to 3 percent of their funding for the program. RDECOM has allowed its laboratories to choose whether to participate and to set their own rates, which could vary for reimbursables and appropriations.[4] It is a type of Tier 1 indirect rate because it applies to the entire organization. However, by law the rate must be levied as a percentage of all funding received, regardless of whether the funds are spent on civilian labor or other costs. Thus, the mechanics of how each Section 219 indirect cost pool is funded are slightly different from the Tier 1 indirect rate, but the need to balance revenue and costs still applies.

### *RDECOM Contractor Practices*

RDECOM does not charge indirect rates on contractors, although its organizations can charge customers a fee as the percentage of a contract cost to manage contracts on behalf of customers. Overall, RDECOM has relatively little visibility into its contract workforce compared

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[2] Cost allocations are used to allocate a common cost to a project or work breakdown structure (WBS) task directly benefiting that cost. Indirect costs are a common type of cost allocated across projects and tasks. GFEBS also performs cost allocations with civilian labor costs. Civilians are associated with a single line of funding from which their payroll is paid, but GFEBS allocates costs based on civilians' hours worked to the projects and tasks on which they worked, as reported in time cards in the Automated Time, Attendance, and Production System (ATAAPS). As explained later in this chapter, ATEC makes extensive use of contractor cost allocations in which ATEC's contracts cite ATEC's appropriations, but the costs of the contractors are allocated to the projects on which those contractors work. Other costs that can be allocated include fuel and leased vehicle costs. Appendix K explains cost allocations in greater detail.

[3] There can also be multiple Tier 2 and Tier 3 charges, although this occurrence is not common. For example, at TARDEC, direct labor charges from personnel in the Ground Systems Cyber Engineering Branch are assessed at two Tier 2 rates, along with the TARDEC-wide Tier 1 rate and a branch-specific Tier 3 rate.

[4] Throughout the past several years, participating in the Section 219 program varied within and across RDECOM organizations. In FY 2017, all organizations except the Communications-Electronics Research, Development, and Engineering Center (CERDEC) participated to some degree, although they varied on the percentage and whether they charge reimbursable customers. Section 212 of the FY 2017 NDAA updated the guidelines to allow laboratories to use between 2 and 4 percent of their funding. It is unclear if the law requires labs to participate in the program or whether it just sets a rate floor for labs that choose to participate. The FY 2018 NDAA further codified this program into 10 U.S.C. 2363, "Mechanisms to Provide Funds for Defense Laboratories for Research and Development of Technologies for Military Missions."

with ATEC and was unable to easily distinguish spending for support contractors versus spending on other types of contracts. Contractors are hired on a project-by-project basis; consequently, project managers have good visibility into their contractors, although this visibility does not roll up to higher levels.

### *RDECOM's Indirect Budgeting Processes*

RDECOM standardized indirect budget processes as part of the development of the AMC CONOPS. However, these processes appear to be less mature than the accounting policies and are not as well documented. Appendix C discusses these processes in detail.

A key component of RDECOM's budgeting process is the Financial Integrated Reporting Environment (FIRE). ARDEC developed FIRE to help managers develop budgets, calculate indirect rates, and monitor execution. As a standardization effort, RDECOM required all of RDECOM, who previously used a variety of different budgeting systems, to use FIRE. FIRE requires RDECOM organizations to assign staff to direct or indirect efforts and produces estimates of indirect labor costs. FIRE also requires organizations to budget nonlabor costs. FIRE then calculates indirect rates for each cost pool. These indirect rates go through an approval process within RDECOM and up to HQ AMC before being entered into GFEBS, and GFEBS automatically applies the rates to civilian labor hours. FIRE also provides RDECOM personnel with tools to monitor budget execution data produced by GFEBS during the year of execution.

### *Customer Feedback on RDECOM's Practices*

In discussions with the study team, RDECOM's customers often expressed frustration about the level of transparency they had into the prices they paid. All customers acknowledged that suppliers were responsive to questions, but many customers indicated that they had difficulty understanding prices even with help from the suppliers' financial staff. In addition, the introduction of tiers created winners or losers among the customer base, and this led to additional frustrations. Those customers forced to pay higher indirect rates following the implementation of the CONOPS at RDECOM were naturally most concerned that the rates were not equitable. These higher rates came as a surprise to customers, who had not budgeted for the higher costs. Customer frustrations reached their apex when RDECOM organizations first began implementing the CONOPS but have begun to dissipate as customers have become more familiar with the new policies and have been able to budget accordingly.

RDECOM's customers in the program executive offices (PEOs) were particularly concerned about the prices they pay for matrixed personnel, who they often hire to augment their program office staff with engineering expertise. These customers felt they had little discretion about where they obtained these engineers, since RDECOM provides the only source of government employees with the expertise they require and since the nongovernmental employees offered by contractors cost considerably more. These customers felt this reduced RDECOM's incentives to

be efficient with its indirect spending and could potentially incentivize RDECOM to make this captive customer base pay more than its fair share of indirect costs.

## ATEC Test Center Funding Model

ATEC's organizations are listed in Table 2.2. As Appendix B shows in detail, Army Evaluation Command (AEC) and Operational Test Command (OTC) use a different funding model relying on reimbursables mainly for noncivilian labor direct costs. Therefore, the study team, in consultation with the sponsor, stakeholders, and ATEC, excluded these organizations from the in-depth analysis of alternative funding models and focused instead on the test ranges.

**Table 2.2. ATEC Organizations**

| Name | Description | Considered in Study | MRTFB |
|---|---|---|---|
| HQ ATEC | ATEC Headquarters | Partially[a] | |
| AEC | Army Evaluation Command | | |
| OTC | Operational Test Command | | |
| ATC | Aberdeen Test Center | ✓ | ✓ |
| EPG | Electronic Proving Ground (Fort Huachuca) | ✓ | ✓ |
| RTC | Redstone Test Center | ✓ | |
| WDTC | West Desert Test Center (Dugway Proving Ground) | ✓ | ✓ |
| WSTC | White Sands Test Center | ✓ | ✓ |
| YTC | Yuma Test Center | ✓ | ✓ |

[a] Since HQ costs are currently funded mainly through appropriations, only the WCF model, whose policies require customer reimbursement for HQ costs, is considered as an alternative.

Five of the six ATEC test centers are designated as within the MRTFB. The MRTFB is defined as "a designated core set of DoD T&E [test and evaluation] infrastructure and associated workforce that must be preserved as a national asset to provide T&E capabilities to support the DoD acquisition system."[5] Section 232 of the FY 2003 NDAA requires that "the institutional and overhead costs of a facility or resource of a military department or Defense Agency that is within the Major Range and Test Facility Base are fully funded through the major test and evaluation investment accounts of the military department or Defense Agency, the account of the Central Test and Evaluation Investment Program of the Department of Defense, and other appropriate accounts of the military department or Defense Agency."[6] Institutional funding for investments

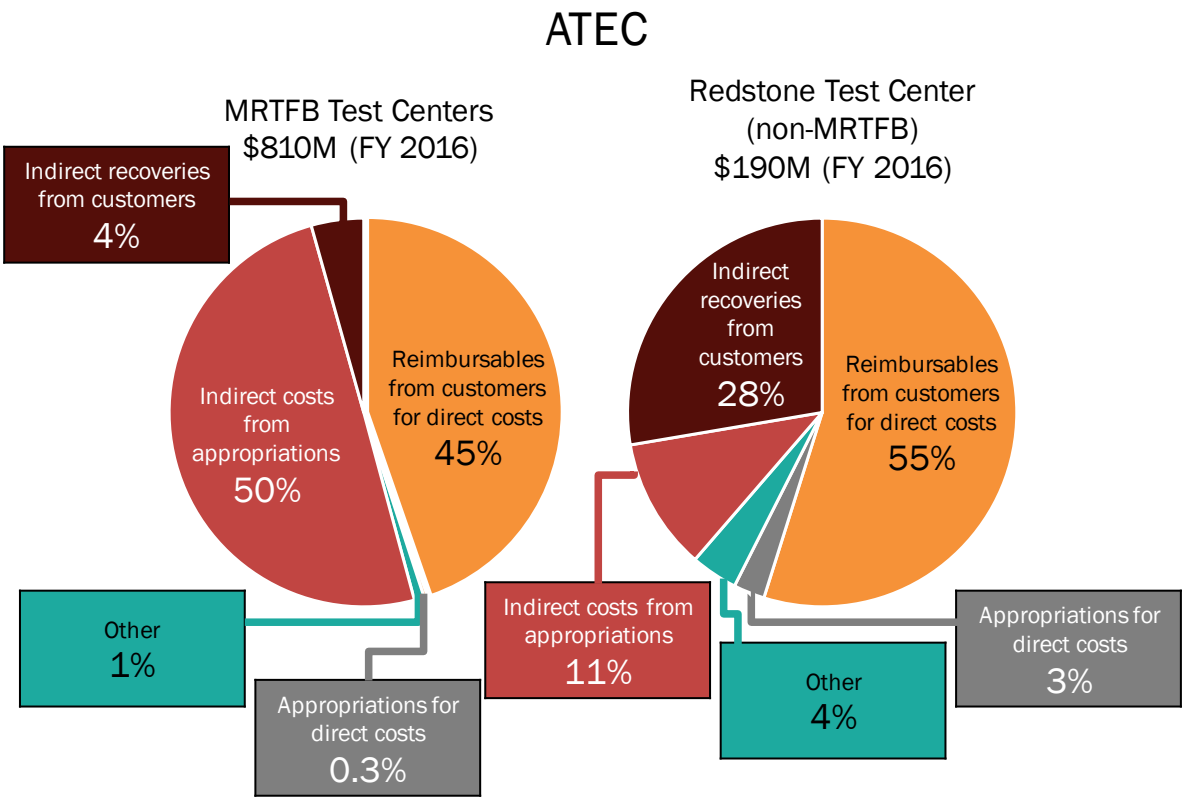
[5] Headquarters, Department of the Army, Test and Evaluation Policy, Army Regulation 73–1, Arlington, Va.: HQDA, November 16, 2016.

[6] Appendix E reviews the evolution of MRTFB funding policies in detail.

comes from several sources, both directly through Army appropriations and DoD Central Test and Evaluation Investment Program (CTEIP) funds and indirectly through equipment provided by Project Manager Instrumentation, Targets, and Threat Simulators (PM ITTS). ATEC's Redstone Test Center (RTC) is wholly outside the MRTFB. RTC, along with a few non-MRTFB capabilities located at MRTFB test centers (e.g., Yuma Proving Ground's [YPG] counter improvised explosive device [IED] capabilities) receive most of their funding through charges to customers, which include charges for indirect expenses. RTC receives some institutional funds to pay for a small share of indirect expenses and funds investments similarly to the other test centers.

Figure 2.3 shows the character of ATEC's funding. ATEC test centers designated within the MRTFB receive about half of their funding from customers to pay for direct costs of tests and the other half from institutional funds to pay for indirect costs. RTC receives most of its funding through direct and indirect charges to customers. RTC receives some institutional funds to pay for a small share of indirect expenses and funds investments similarly to the other test centers.[7]

**Figure 2.3. FY 2016 Funding Profiles at ATEC**




SOURCE: RAND Arroyo Center analysis of ATEC GFEBS expense data for FY 2016.

[7] Appendix B explores ATEC's funding, costs, and cost accounting policies in depth. Appendix C outlines both commands' indirect budgeting process.

### *ATEC's Indirect Cost Structure*

ATEC's indirect cost structures are somewhat simpler than RDECOM's since ATEC largely relies on appropriations to fund its indirect costs. However, practices vary between organizations. When ATEC organizations charge indirect rates to customers they use a base of both civilian and contractor DLH (recall that RDECOM only used civilian DLH).

ATEC's **MRTFBs** maintain a single indirect cost pool for the entire organization. This single indirect cost pool is mostly funded by ATEC's appropriations, since MRTFB rules prohibit charging DoD customers indirect costs. Non-DoD customers, however, are charged indirect rates and therefore supplement the indirect funds available for ATEC's test centers. Since these provide a relatively small share of these indirect costs, ATEC's cost accounting guidance document (ATEC 37–11) requires only a single indirect rate based on projections of the size of indirect costs and projected hours worked so that non-DoD customers are allocated an appropriate share of total indirect costs. Thus, ATEC's MRTFBs do not have an RDECOM-like tier structure.

**Non-MRTFB capabilities at MRTFBs** charge customers for indirect costs because they are not subject to the MRTFB funding policies. The indirect rate that ATEC charges customer for non-MRTFB indirect costs is much like a Tier 3 rate in the AMC CONOPS because the rate funds indirect costs that are specific to the non-MRTFB capability only, and ATEC charges the rate only to projects that utilize that capability.[8] There are no charges for other indirect costs that apply to MRTFB capabilities (i.e., there are no Tier 1 or Tier 2 indirect rates).

**RTC** is wholly outside the MRTFB, so it recovers most of its indirect costs from customers and, in that way, is similar to RDECOM. RTC has an indirect rates structure much like the AMC CONOPS, although it uses different terminology and slightly different accounting math to calculate the rates.

- RTC's "Center Support Directorate" rate parallels the Tier 1 rate at RDECOM. The Center Support Directorate includes common services like human resources that benefit all portions of RTC, so all labor hours are taxed using a common rate to pay for these indirect costs. RTC receives $10 million of appropriations each year to fund indirect costs. These appropriations fund costs in the Center Support Directorate; consequently the rate charged to customers is reduced to account for these appropriations.
- Each mission directorate at RTC charges a "low rate" that funds costs that are common to the directorate. This low rate is analogous to the Tier 2 indirect rates in the AMC CONOPS.

[8] ATEC 37–11 appears to require customer funding be used to fund all indirect costs associated with the non-MRTFB capability, including labor, capability sustainment, and nonfacility/nonlabor (NFNL) costs. However, in conversations with managers of counter-IED capabilities at Yuma Test Center, the study team learned only capital costs associated with this non-MRTFB capability are charged indirectly to customers.

- Each mission directorate at RTC charges a "high rate" to pay for higher costs associated with open air ranges. The high rate is equal to the low rate plus a surcharge that funds the range expenses. This surcharge is analogous to Tier 3 indirect rates in the AMC CONOPS. According to managers at RTC, the biggest driver of these additional costs at the ranges is weather. Due to unfavorable weather, range personnel can charge direct only a little over half the time, so downtime must be charged to the directorate's indirect cost pool.

Unlike RDECOM, RTC's directorates manage a single cost pool. Recoveries from the low rates and high rates are pooled together to fund all indirect costs in the directorate, including the range costs.

### *ATEC Contractor Practices*

In cases where ATEC charges customers indirect rates (e.g., at RTC or nongovernment customers), ATEC loads those indirect rates onto the DLHs of both civilian and contractor personnel. Relative to other Army organizations like RDECOM, ATEC has a high level of visibility over its contract workforce. It has large contracts that it can use to fund contractor efforts across projects for different customers. These contracts require that contractors report their hours worked on time cards in the Contractor Information Management System (CIMS). GFEBS performs contractor cost allocations to allocate the cost of those contractors to the projects they work or to appropriations when they work on indirect activities, based on the number of hours the contractors report on their time cards.

ATEC's contracting practices benefit its business practices and its customers. It can easily retask its contractors and charge those costs appropriately (including appropriate indirect rates, if applicable). However, a significant downside to these practices is that, given current limitations in GFEBS, these practices create temporary underreporting of disbursements of ATEC's appropriations. When contractors charge to projects, GFEBS immediately transfers funds from customers and credits those funds to ATEC's appropriations (since ATEC's contracts cite those appropriations). Since there is a delay in contractors' invoicing ATEC and DoD disbursing funding to contractors (usually about two months), those funds artificially lower the apparent disbursements of ATEC's appropriations, and this can lead to attempts by DoD to reduce funding. Full details and examples of this problem are provided in Appendix K.

### *ATEC's Indirect Budgeting Processes*

Since the FY 2003 NDAA, which standardized MRTFB cost policies, ATEC has developed a high degree of standardization of its budgeting policies within its MRTFBs. Appendix C discusses these processes in detail.

Like RDECOM, ATEC generates operational budgets for its personnel—including contractors—and for nonlabor indirect costs. ATEC uses statistical methods to estimate total DLH across each test center. Due to the unpredictability of testing, ATEC found their forecasting

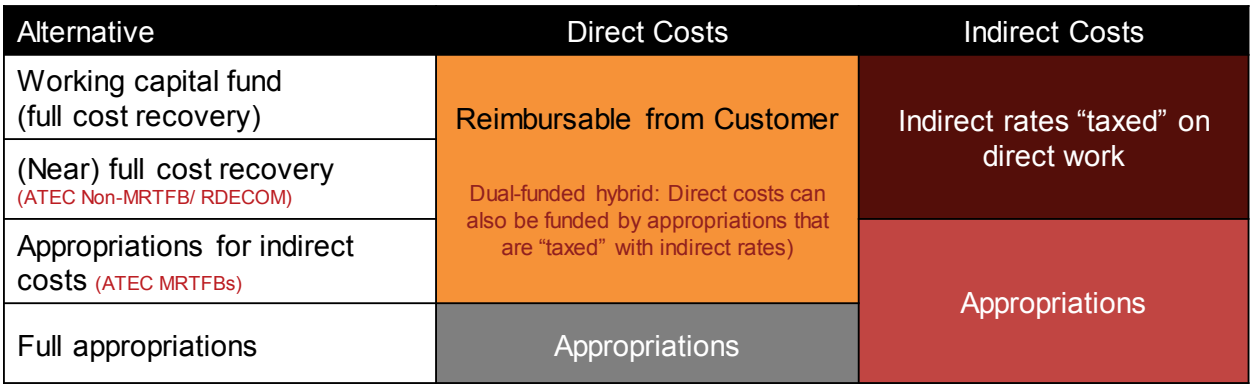
methods are more reliable than trying to identify all test requirements prior to the budget year. Using these DLH projections, ATEC estimates staff indirect costs based on historic ratios of indirect to direct hours, as well as salary information. ATEC also estimates nonlabor indirect costs, largely based on historic costs or computed requirements. ATEC usually receives less funding for indirect costs than their calculated requirements, so each test center commander has authority for deciding how to spend their allocation of appropriations for indirect costs. Funding for capital investments at ATEC comes through several sources that use competitive processes to determine allocations.

Indirect budgeting processes at RTC are less documented than at ATEC's MRTFBs. RTC utilizes ATEC's statistical models to project its workload, but—like RDECOM—it budgets each staff member (both civilian and contractor) to estimate labor costs in each indirect cost pool. RTC further estimates its nonlabor indirect costs. RTC has fewer issues with underfunding of indirect costs for two reasons: first, RTC can set its indirect rates to recover its indirect requirements; and second, RTC can divest of underutilized capabilities to reduce its indirect costs. RTC uses software called Pro3 with similar functionality to RDECOM's FIRE in helping to create budgets, calculate indirect rates, and monitor budget execution.

# 3. Overview of Funding Models Used Across DoD

RAND Arroyo Center identified funding models used across DoD as possible alternative courses of action for RDECOM and ATEC's test ranges.[1] Figure 3.1 shows the alternatives considered,[2] while the remainder of this chapter discusses these funding models.

**Figure 3.1. Funding Models Evaluated**




## Alternative Funding Models Evaluated

### *Working Capital Fund/Full Cost Recovery*

The U.S. Navy funds its laboratories and warfare centers through full cost recovery in the Navy Working Capital Fund. Full cost recovery requires that suppliers recover all costs from customers or projects, including charges for direct costs and through indirect collections that are "taxed" on the direct costs. There are strict rules and DoD-wide standards discouraging appropriations for indirect costs and encouraging WCF providers to include all costs of doing business in customer rates. For example, WCF policies require customers pay for all such services from third-party organizations, even if such services are provided "free" to non-WCF

[1] Appendix E provides an overview of previous work examining internal funding models across DoD and examines how and why MRTFB funding policies evolved over time. Appendix F reviews the funding models and cost accounting policies used by the U.S. Air Force, U.S. Navy, and U.S. Army Corps of Engineers' U.S. Army Engineer Research and Development Center to fund internal research, engineering acquisition support, and testing.

[2] The study team initially considered one additional model, appropriations for civilian personnel and indirect costs. The Air Force Research Laboratory (AFRL) is nearly fully funded for its indirect and civilian labor costs, with only a small level of reimbursables. ATEC uses this model outside its ranges at AEC and OTC. We did not explore this option in greater detail for ATEC's test centers or RDECOM's labs because civilian personnel and contractors are substitutes for each other in these commands, which creates opportunities to "game" the system to provide relatively inexpensive civilian labor to preferred customers.

organizations. Hence, WCF models are full cost recovery, although some relatively minor exceptions exist. WCF rules also create stabilized rates in advance of the year of execution. The stabilized rates, in turn, result in a profit or loss if actual workload differs from the forecasted workload that must be returned to or recovered from customers in future years. WCF organizations recover capital costs over the life of capital assets through depreciation charges to customers. WCF organizations typically obtain all funding through reimbursables from customers who receive appropriations.[3] Although the WCF has greater reliance on reimbursables than the other funding models considered, the OUSD(C) guidance specifically excluded the WCF from reducing reimbursable costs.

### *(Near) Full Cost Recovery*

RDECOM and RTC currently fund their work through a (near) full cost recovery model. Under the (near) full cost recovery model, suppliers recover most of their costs from charges to projects assessed with indirect rates. Both RDECOM and RTC receive reimbursable funding from customers, and this funding is taxed to pay for indirect costs. In addition, RDECOM receives a large amount of appropriations for activities that do not benefit a specific customer, and these are also taxed to pay for indirect costs. This alternative does not need to be true full cost recovery because suppliers can also receive appropriations for some indirect costs and can receive services and equipment for "free"[4] from third-party organizations like Army Installation Management Command (IMCOM) and program managers.

### *Appropriations for Indirect Costs*

Appropriations for indirect costs is the status quo for ATEC's MRTFB test centers as well as MRTFB test centers in the Air Force and the Navy. MRTFB customers pay only for direct costs that can be attributed to a specific test or a specific program, and the remaining funding for indirect costs is paid for by appropriations. All MRTFB capabilities across DoD have adopted this funding model because Section 232 of the FY 2003 NDAA prohibits MRTFB service providers from charging DoD customers for more than the direct costs of tests.

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[3] Organizations can be dual funded and take both appropriations and customer reimbursables. For example, Navy MRTFBs receive appropriations for indirect costs but operate in larger warfare centers that are otherwise funded through the Navy WCF. Dual-funded WCFs are a less feasible option for ATEC's MRTFBs without significant reorganization since entire organizations—or nearly so—are designated as MRTFBs. We explored several options for partially funding ATEC's MRTFBs and RDECOM through the WCF. However, we found that most of the options were infeasible without policy changes and likely could not be supported by existing financial systems. Therefore, this report focuses on full implementation of the WCF.

[4] These services are "free" from the perspective of the customer who does not pay, but they are not free to the providers or to the Army, who have to pay for these services.

### *Full Appropriations*

Full appropriations provides full funding through appropriations to service providers. Service providers receive appropriations to cover their full costs without any reimbursement from customers. We did not find any examples of DoD research, development, test, and evaluation (RDT&E) service providers using this funding model, although it is used when engineering personnel are assigned to and funded directly by program managers (e.g., in the Air Force Life Cycle Management Center [AFLCMC] and in Navy acquisition support personnel who are in matrixed directorates within a Navy Systems Command).

## Direct Charge and Direct Cite Options to Reduce Reimbursable Funding

In the models discussed above, reimbursable funding is typically used to transfer funds from customers to suppliers within DoD. Alternatives that reduce reimbursable funding are direct charge and direct cite, which allow the supplier to charge costs directly to customers' funds.

Direct charge is an Army-specific mechanism that Army customers can use to pay suppliers, provided both customer and supplier use GFEBS. For many intra-Army relationships, direct charge can be used instead of reimbursables in (near) full cost recovery and appropriations for indirect cost models.[5] Direct charge allows suppliers to charge costs directly to customers' funding without transferring funds to the supplier organization. Neither RDECOM nor ATEC uses direct charge extensively due to its current drawbacks.[6] Chapter 7 discusses how direct charge can reduce civilian reimbursable costs and its drawbacks.

Direct cite is used across DoD and allows suppliers to cite the customers' funds directly when funding contracts. Direct cite avoids the transfer of reimbursable funds through the supplier, who would otherwise serve as an intermediary. Presently, some RDECOM organizations use direct cite extensively to facilitate the transfer of funding from their customers to their contractors.[7] Direct cite is also be used by WCF organizations such as the Navy laboratories and the Air Force Research Laboratory, which accepts very little reimbursable funding.[8]

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[5] Direct charge can be used for Economy Act orders only (i.e., not project orders) when both the customer and supplier are Army organizations that use GFEBS as their financial systems.

[6] RDECOM received about $120 million in direct charge funding in FY 2016 or about 2 percent of its total funding. ATEC received about $23 million in direct charge funding in FY 2016 or about 1 percent of its total funding.

[7] RDECOM facilitated about $2.6 billion of direct cite funding between its customers and its contractors in FY 2016. ATEC rarely uses direct cite and facilitated only about $4 million in direct cite funding.

[8] As Table F.1 shows, most of AFRL's funding is received from appropriations or managed through direct cite. Only about 3 percent of external funding managed by AFRL arrives through reimbursables.

# 4. Criteria for Assessing Funding Models

RAND Arroyo Center assessed the funding models using a variety of criteria chosen in consultation with the sponsor, commands, and stakeholders. As discussed in the introduction, the OUSD(C) concerns about financial issues and accounting provided an impetus for this study. To assess these concerns, we, in partnership with Deloitte, developed definitions for auditability, transparency, and appropriateness. Although these accounting criteria characterize well many of the current concerns about reimbursable practices, our discussions with the commands, their customers, stakeholders, and others in DoD revealed additional concerns about the near- and long-term impacts on both customer and provider organizations of transitioning to alternative funding mechanisms. Table 4.1 lists and defines the criteria that were used to assess the funding models.

**Table 4.1. Evaluation Criteria**

| Criterion | Evaluation Questions for Each Alternative |
|---|---|
| *Financial and accounting criteria* | |
| Financial auditability | How does the model affect suppliers' need and ability to provide evidence of business processes and transactions? |
| Transparency | How does the model affect customer and stakeholder understanding of transactions? |
| Appropriateness | How does the model affect suppliers' ability to ensure rates are charged fairly and consistently? |
| Compliance with laws, regulations, and policies | How does the model affect suppliers' compliance? How flexible are the model's rules? |
| One-time transition costs | What costs occur only when transitioning to this funding model? |
| Ongoing transition costs | What ongoing costs (or savings) occur after transitioning to this funding model? |
| *Customer criteria* | |
| Price impacts on customers | How much more or less will customers pay? |
| Stability of customer costs | Do prices change gradually and predictably? |
| Customer incentives | How will prices influence customer demands in this funding model? |
| *Supplier criteria* | |
| Adaptability to changes in workload | How does the model affect suppliers' ability to invest in new capabilities or divest of unneeded capabilities and adjust workforce? |
| Sustainability of low-demand capabilities | How does the model affect suppliers' ability to preserve capabilities needed in the future? |
| Supplier incentives | How does the funding model affect suppliers' decisions about funding, workload, costs, capabilities, and responsiveness to customers? |

## Financial and Accounting Criteria

**Financial Auditability** is management's ability to provide evidence of end-to-end business processes from the time a transaction is initiated to the point when financial data are reported in the financial statements.[1] Deloitte concluded that RDECOM and ATEC can achieve auditability objectives through any of the funding models being considered, but the relative difficulty of achieving auditability varies depending on the amount of evidence required. Deloitte identified 22 types of key supporting documentation (KSD)[2] that may be examined in a financial statement audit for the alternative funding models presented. (Appendix H lists these types of KSDs in detail and shows how they relate to funding mechanisms.)[3] Ultimately, an auditor's opinion depends on the reliability of the audit evidence that the auditee provides, which is judged by the auditor according to audit standards developed by the American Institute of Certified Public Accountants.

**Transparency** ensures documentation exists that clearly supports reported transactions to stakeholders including customers and auditors. Different actors possess different transparency requirements. For example, **transparency to auditors** requires transparent documentation to provide the proper evidence during an audit. **Transparency to customers** requires an understanding of how costs are charged to customers. For example, bills for services performed provide a breakdown of quantity and price per unit. **Transparency to Headquarters, Department of the Army (HQDA)** also requires an understanding of how costs are charged to customers but at a different level of detail with greater breadth.

**Appropriateness** ensures transactions are equitable (appropriate transactions are also legal and legitimate, executed in compliance with laws and regulations, but the study team split out compliance concerns into a separate criterion in the next paragraph). Equitability is inherently subjective. For example, many of the concerns voiced by customers and stakeholders were about the appropriateness of the supplier organizations' practices for allocating indirect costs to customers. However, a primary goal of the CONOPS was to make rates more equitable by closely linking rates to the customers who benefited from indirect costs.

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[1] Appendix G describes how the study team, in partnership with Deloitte, generated criteria for financial auditability, transparency, and appropriateness.

[2] For example, one KSD for reimbursable transactions is Form 448, Military Interdepartmental Purchase Request (MIPR). Suppliers must ensure that information required by Form 448 (or a form with the equivalent information) is recorded and can be supplied to an auditor on request.

[3] RDECOM and ATEC must be able to provide supportable and reliable evidence for transactions, and this is satisfied through the KSDs. Other factors, such as internal controls and information technology requirements, can impact the ease with which a command can be audited. For example, an auditor may perform less testing of KSDs in an organization possessing a strong internal control environment.

**Compliance with laws, regulations, and policies** considers how different alternatives conform to Army, DoD, and congressional requirements. For example, Section 232 of the FY 2003 NDAA requires the military departments to fund the indirect costs of MRTFBs.[4]

Transition costs include both the **one-time transition costs** needed to transition to an alternative funding model as well as **ongoing transition costs** (or savings). Appendix I examines transition requirements in greater detail.

The remainder of the criteria focus on potential mission impacts of alternative funding models. Prior RAND work has examined the impacts of different funding models on customers' and suppliers' decisions, noting that some models can incentivize behavior that is counterproductive to Army or DoD goals.[5]

## Customer Criteria

**Price impacts on customers** assesses how prices could change under each alternative relative to the organization's current funding model. Price changes between Army customers and suppliers that do not induce customers or suppliers to change behavior are cost neutral to the Army. However, when changes in price induce changes in behavior, net costs to the Army can change. Price impacts can vary by the size and direction of change. Customers and suppliers can easily adjust to small changes in price, but large changes in price could be desirable if prices currently do not provide proper incentives (see "customer incentives" and "supplier incentives" criteria below). The direction of change is usually evident—full appropriations means that customers pay nothing while the WCF recovers all costs through customer prices. The magnitude

[4] Appendix E includes a discussion of how MRTFB policies evolved.

[5] See, for example, Frank Camm and H. L. Shulman, *When Internal Transfer Prices and Costs Differ: How Stock Funding of Depot-Level Reparables Affects Decision Making in the Air Force*, Santa Monica, Calif.: RAND Corporation, MR-307-AF, 1993; Edward G. Keating and Susan M. Gates, *Defense Working Capital Fund Pricing Policies: Insights from the Defense Finance and Accounting Service*, Santa Monica, Calif.: RAND Corporation, MR-1066-DFAS, 1999; Edward G. Keating, *RAND Research Suggests Changes in Department of Defense Internal Pricing*, Santa Monica, Calif.: RAND Corporation, IP-216-DFAS, 2001; Edward G. Keating, Susan M. Gates, Jennifer E. Pace, Christopher Paul, and Michael G. Alles, *Improving the Defense Finance and Accounting Service's Interactions with Its Customers*, Santa Monica, Calif.: RAND Corporation, MR-1261-DFAS, 2001; Ellen M. Pint, Marygail Brauner, John R. Bondanella, Daniel A. Relles, and Paul S. Steinberg, *Right Price, Fair Credit: Criteria to Improve Financial Incentives for Army Logistics Decisions*, Santa Monica, Calif.: RAND Corporation, MR-1150-A, 2002; Edward G. Keating, Susan M. Gates, Christopher Paul, Aimee Bower, Leah Brooks, and Jennifer E. Pace, *Challenges in Defense Working Capital Fund Pricing: Analysis of the Defense Finance and Accounting Service*, Santa Monica, Calif.: RAND Corporation, MR-1597-DFAS, 2003; and Edward G. Keating, Ellen M. Pint, Christina Panis, Michael Powell, and Sarah H. Bana, *Defense Working Capital Fund Pricing in the Defense Finance and Accounting Service: A Useful, but Limited Tool*, Santa Monica, Calif.: RAND Corporation, RR-866-OSD, 2015. In addition, studies of the Navy transition of its shipyards out of the Navy WCF to a combination of appropriations and reimbursables noted that it changed the alignment of customer and supplier incentives (see Andrew M. Cain, *Comparison of the Navy Working Capital Fund and Mission Funding as Applied to Navy Shipyards*, Monterey, Calif.: Naval Postgraduate School, June 2006; and Congressional Budget Office, *Comparing Working-Capital Funding and Mission Funding for Naval Shipyards*, Washington, D.C.: CBO, April 2007). A full discussion of this prior research is included in Appendix E.

of these changes is less evident, so RAND Arroyo Center estimated potential price changes using financial data provided by ATEC, RDECOM, the Army WCF (AWCF), and AMC. Appendix J discusses these estimates.

**Stability of customer prices** assesses whether prices change gradually and predictably over time after the alternative has been implemented. Prices are least stable and predictable for alternatives that recover indirect costs from customers, since indirect rates are a function of workload, which can be difficult to predict (i.e., more workload means lower indirect rates).

**Customer incentives** assesses how changes in prices will affect customer demands. Ideally, economic theory suggests internal prices should be set at the marginal cost to the Army to ensure that customer demand for the Army's services equals its capacity to meet those demands. Prices lower than marginal cost will tend to increase customer demand, which can lead to capacity shortfalls. On the other hand, prices higher than marginal cost can dissuade customers from using Army capabilities, especially if substitute suppliers are available, resulting in underutilization. This underutilization can be costly. When Army suppliers charge Army customers prices that include fixed costs, Army customers may reallocate demand to non-Army suppliers that seem cheaper. However, the shift in demand to non-Army suppliers increases costs to the Army when the prices of the non-Army supplier are higher than the marginal cost of an Army supplier.[6] In extreme cases, high prices can result in a "death spiral" as high indirect rates lead to a reduction in demand, which raises indirect rates ever higher. Table J.2 in Appendix J shows estimated changes in demand from RDECOM's and ATEC's customers for a range of price elasticities.[7] Decreases in demand will further increase indirect rates; therefore, transitions could lead to an initial period of price instability and unpredictability.

## Supplier Criteria

**Adaptability to changes in workload** assesses how well suppliers can increase or decrease their workforce or invest in new capabilities or divest of unneeded capabilities under each alternative.

**Sustainability of low-demand capabilities** assesses how well suppliers can protect capabilities that are underutilized in the short term but will likely be needed in the future. In some cases, such as MRTFB test capabilities, the Army and DoD are interested in preserving

[6] The marginal cost to the Army of using an external supplier ($MC_S$) is equal to the price that supplier charges ($P_S$). However, the marginal cost of the Army using an Army supplier ($MC_A$) is usually less than the average cost ($AC_A$). If intra-Army pricing sets prices ($P_A$) equal to average cost (i.e., $P_A = AC_A$), then customers will be incentivized to use an external supplier when $P_A > P_S$, increasing Army costs when $AC_A = P_A > P_S = MC_S > MC_A$. The larger the Army supplier's fixed costs, the bigger the difference between $P_A = AC_A$ and $MC_A$ and the more likely the situation will arise.

[7] Price elasticity measures how much a customer's demand changes when the price it faces changes. Specifically, it measures the percent change in demand associated with a 1-percent change in price.

capabilities through periods of disuse. However, for some capabilities (e.g., cutting-edge science and technology [S&T]), incentives to disinvest of obsolescent capabilities may be a desirable feature.

**Supplier incentives** assesses how the alternatives impact suppliers' decisions about funding, workload, costs, capabilities, and responsiveness to customers. Incentives should encourage suppliers to act in the best interest of the Army/DoD. Customer and Army/DoD priorities are often in alignment (e.g., conducting tests efficiently), so incentives that increase suppliers' responsiveness to customers further Army/DoD priorities. However, if customers do not share Army/DoD priorities (for example, customers may have a shorter perspective focused on a single program) then it is more important for suppliers to be responsive to the Army than to customers. Reimbursement from customers is often believed to lead suppliers to be more responsive to customers, but if customers have little discretion in where they take their business, then suppliers do not need to be responsive to customers to maintain business.

# 5. Assessments of Alternative Funding Models

RAND Arroyo Center assessed each of the alternative funding models in detail, across each of the criteria[1] for the three types of activities (RDECOM, ATEC MRTFBs, and ATEC Non-MRTFB Testing). The study team conducted this assessment by creating a matrix identifying the strengths and weaknesses of each alternative relative to the activity's current funding model. Matrices compared the criteria discussed in Chapter 4 with the alternatives. Three matrices were evaluated (one for RDECOM, ATEC MRTFBs, and ATEC Non-MRTFBs). The highlights shown in Table 5.1 are the strengths and weaknesses that the study team subjectively assessed as being most salient to the assessment. The full set of evaluation matrices is presented in Appendix M. The remainder of this chapter discusses the strengths and weaknesses of each of the alternatives.

**Table 5.1. Highlights of Assessments of Alternatives**

| Alternative | Potential Strengths | Potential Weaknesses |
|---|---|---|
| Working capital fund | • Adopts DoD-wide standards<br>• Enables the most adaptability of investments to customer/Army needs<br>• Incentivizes divestment of unneeded capabilities<br>• Reduces price surprises<br>• Fixes ATEC's contractor cost reporting | • Can create large price increases leading to underutilized capacity and indirect rate "death spirals"<br>• May reduce customer transparency due to shift to a different financial system<br>• Likely requires significant resources to implement |
| (Near) full cost recovery | • Enables investments that are adaptable to customer/Army needs<br>• Incentivizes divestment of unneeded capabilities<br>• Can offer marginal cost pricing for capabilities with low fixed costs<br>• Provides the ability to sustain some low-demand capabilities | • Could potentially create large price increases and "death spirals"<br>• Is not governed by Army-wide or DoD-wide standards<br>• Is the least compliant with the request to reduce reimbursables |
| Appropriations for indirect costs | • Is the only feasible reimbursable model for MRTFBs without policy changes<br>• Offers the best alignment of visibility and costs<br>• Is best at preserving capabilities<br>• Is closest to marginal cost pricing for underutilized capabilities with high fixed costs | • Funds indirect costs with appropriations that do not necessarily track customer needs |
| Full appropriations | • Eliminates many of the financial and accounting issues caused by reimbursables | • Is inappropriate for use in customer-supplier relationships<br>• Misaligns customer and supplier incentives<br>• Reduces adaptability of the workforce as priorities change |

[1] The study team worked with the sponsor, stakeholders, and commands to identify "use cases" that illustrate a perceived problem with RDECOM and/or ATEC's current funding model. Each use case overlaps several criteria. Appendix K explains these use cases.

## Working Capital Fund

The WCF provides a DoD standard reimbursable model that has the potential to be responsive to customers. However, the lack of flexibility in the WCF full-cost rules creates high risk to capabilities and customers.[2]

### *Strengths*

The WCF is a standardized reimbursable model used across DoD. This standardization helps to better ensure **appropriateness** because WCF activities must adhere to DoD standards. Customers are dissatisfied with the **transparency** and appropriateness of the current accounting practices of RDECOM and ATEC's non-MRTFB capabilities, in part because there are no DoD-wide standards for allocating indirect costs as there are for the WCF.

The WCF provides a high degree of **adaptability to changes in workload.** The WCF provides suppliers with the ability to make investments and finance them over many years through depreciation. When a customer can choose among competitive suppliers, full cost recovery in the WCF can provide **supplier incentives** to reduce costs by divesting of unneeded capabilities and achieving efficiencies that keep prices competitive with those of other suppliers.

The **stability and predictability of customer costs** is high in the near term in the WCF because average prices to customers are set in advance, allowing customers to plan for changes when requesting funding through the DoD programming and budgeting process. However, changes in cost accounting practices can still result in winners and losers because customers do not pay the average rate; instead, customers pay actual direct costs, and indirect rates charged to customers vary by personnel used. In addition, returning profit and recovering losses from customers in future years results in some long-term price instabilities.[3]

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[2] The discussion in this section assumes that RDECOM and/or ATEC test centers would completely transition to a WCF model. Dual-funded and hybrid WCF models are also possible (e.g., MRTFBs within Navy labs accept appropriations and operate similarly to Army and Air Force MRTFBs, outside the WCF). Appendix N presents some alternative WCF concepts and assesses them across criteria and use cases. However, many of the concepts would not be possible without changes to DoD policies or statutes, and commands expressed a high degree of uncertainty about whether the concepts could be implemented without major reforms to financial systems; thus, we did not consider these options in depth.

[3] Much of the research about WCF incentives cited earlier is critical of price stability mechanisms used by the WCF. WCF activities can potentially stabilize the price of a service to customers, and this can result in large gains and losses if the actual cost of the service varies considerably. However, WCF pricing can stabilize the average price of direct labor hours, which is how labs within the Navy WCF stabilize prices. Customers are charged for the actual number of hours they use, as reported on employee time cards, as well as actual nonlabor costs. Financial systems within and outside the WCF usually create labor bands that compute an average price charged for a similar group of employees, and this results in small differences between actual costs and prices charged to customers. The Navy indicated that actual costs in the year of execution were generally close to what was budgeted. WCF gains and losses were generally small and driven by over- or undercollection of indirect rates when direct labor hours worked over- or undershot projections.

ATEC has problems reporting its financial status to the Office of the Secretary of Defense (OSD). ATEC's contracts cite their appropriations, but they are ultimately paid by customer funds that are credited to the appropriations account. When an ATEC contractor performs reimbursable work for an ATEC customer, those costs are immediately transferred from the customer's account and credited to ATEC's appropriations. However, it takes around two months for the contractor to invoice for that work—in the meantime, the credits to ATEC's appropriations make it appear to the OSD that ATEC is underdisbursing its appropriations. The WCF would solve this problem because ATEC could collect funding from customers in the cash corpus,[4] where it would sit until the contractor's invoice and the funding is disbursed to the contractors. For more details on this problem, see Use Case #3 in Appendix K.

### *Weaknesses*

**Price impacts on customers** would be large, as shown in Appendix J. RAND Arroyo Center estimates average prices could increase by about 17 percent at RDECOM, by about 70 percent at RTC, and by nearly 200 percent at ATEC's MRTFBs. The WCF is the most expensive for the customer because they pay for direct costs and an expanded set of indirect costs beyond those paid in (near) full cost recovery (e.g., most costs that are currently paid through appropriations and the costs of services that third-party providers like IMCOM currently provide for free). These high prices can create dysfunctional **customer incentives** when they include large amounts of fixed costs. As the research cited earlier shows, internal prices are more appropriate when they charge customers for the marginal costs they impose and the Army pays for the fixed costs. A risk with the WCF is that it can raise prices to customers well above marginal cost. Above-marginal-cost prices can lead to a cycle where high prices incentivize customers to reduce demand that causes suppliers to raise indirect rates—hence prices—on remaining customers, thereby entering a "death spiral." Unlike (near) full cost recovery, the WCF has little flexibility to cover fixed costs with appropriations, so it is most at risk of entering a death spiral. To avoid this, suppliers require the ability to divest of underutilized capabilities, and this could run counter to Army and DoD goals, such as the desire to preserve MRTFB capabilities.

The WCF has the potential to incentivize suppliers to be responsive to customers to ensure demand. However, monopolist suppliers can afford to be less responsive to customers who have little discretion in where to purchase services. One warning we heard from discussions with the Navy is that the WCF can encourage suppliers to maximize workload (i.e., maximize profit); this can shift suppliers' attention from Navy customers who have no alternative suppliers to customers outside DoD who have considerable discretion in where they spend their funding. The Navy indicated that customer discretion varied by capability and depended on how robust

[4] When establishing a WCF, Congress appropriates funds to a cash corpus, which is an account held at the U.S. Treasury.

capabilities were in the other military departments and the private sector. Because there are many instances where customers do not have discretion, the Navy provides high-level oversight to maintain price discipline.

Because pricing in the WCF is standardized across DoD, it may improve **transparency** from customers. However, Army customers with whom we spoke believe that the WCF would give them *less* transparency because Army customers of RDECOM and ATEC usually work within GFEBS and have good visibility of supplier finances, whereas they do not have much experience or visibility into Logistics Modernization Program (LMP), the enterprise resource planning (ERP) system the Army uses for the WCF. In addition, the average labor rate published by WCF organizations in the President's Budget can mislead customers because actual rates are considerably more complex.

All reimbursable models—including the WCF—have high **auditability** requirements since they require more audit evidence and more internal controls over financial reporting and financial systems than full appropriations. According to Deloitte, the WCF may require 17 types of KSDs versus 18 types of KSDs for non-WCF reimbursables. However, unlike the other reimbursable models, WCF activities cannot use direct charge; the use of direct charge may reduce auditability requirements.

Transition costs are likely to be highest for the WCF. As Appendix I discusses, the transition to a WCF is likely to require **one-time transition costs** as the commands improve their cost accounting processes and migrate to LMP. **Ongoing transition costs** are less clear.

## (Near) Full Cost Recovery

(Near) full cost recovery has more flexible rules than the WCF, but, like the WCF, it also has the potential to be customer focused. However, there are few DoD-wide standards and some risk to capabilities and customers.

### *Strengths*

(Near) full cost recovery does not have the same level of DoD-wide rules standardizing pricing and accounting processes as the WCF, and this can potentially reduce **transparency**. However, since RDECOM has implemented the AMC CONOPS,[5] which requires a standard accounting for indirect costs in a way similar to the WCF, transparency has improved (despite initial setbacks in transparency when the CONOPS was first implemented and customers were learning the new policies). The implementation of the CONOPS also improved **appropriateness** because indirect recoveries from customers are more tightly linked to the indirect costs that benefit those customers (e.g., costs for software licenses used within a single branch at the Tank

[5] Redstone Test Center, which comprises most of ATEC's non-MRTFB test capabilities, already had similar cost accounting policies in place.

Automotive Research, Development, and Engineering Center [TARDEC] are funded through indirect recoveries from that branch's customers—see the TARDEC example in Appendix D). In addition, customers indicated that they have greater transparency over RDECOM's costs because (near) full cost recovery uses GFEBS, which customers are more familiar using.

(Near) full cost recovery is a similar cost recovery model to the WCF. It provides tools to be **adaptable to changes in workload**; providers can tailor the type and intensity of work as customers' needs change throughout the year, whereas full appropriations requires budgeting over a year in advance of the start of a fiscal year. If customers have discretion in where they take their business, it can provide **supplier incentives** to be responsive to customer needs by incentivizing prudent investments and finding efficiencies to lower prices for customers. It has slightly less investment adaptability than the WCF because suppliers must balance costs and recoveries in the year of execution rather than using depreciation to recover investment costs over time.

(Near) full cost recovery provides suppliers additional cost flexibility over the WCF by allowing suppliers to accept appropriations. For example, it is better able than the WCF to **sustain low-demand capabilities** that the Army wishes to retain through appropriations for investments and sustainment of those capabilities.

If properly implemented, (near) full cost recovery provides useful **customer incentives** by encouraging customers to consider the cost to the Army when choosing what to purchase. Further, when customers have a choice among suppliers, (near) full cost recovery encourages customers to choose the best value. Charging higher prices that recover indirect costs from customers imposes less risk on fully utilized capabilities. Fully utilized capabilities cannot enter a death spiral of escalating prices as easily as underutilized capabilities. Higher prices help ration fully utilized capabilities to the customers valuing them most. These higher prices cause customers to consider the opportunity costs they impose on other customers—one customer's use precludes other potential customers from using a capability. Eventually prices may become so high for fully utilized capabilities that customer demand drops below capacity, and the capability potentially enters a death spiral.

### *Weaknesses*

A primary weakness of the (near) full cost recovery model is that there are no Army-wide or DoD-wide standards as there are with the WCF and Appropriations for Indirect Costs (at least for DoD MRTFBs), which have DoD-wide standards. As discussed above, RDECOM has been standardizing its practices and increasing transparency and appropriateness by implementing the AMC CONOPS with similar cost accounting rules as the WCF, and this has improved transparency. However, these changes increased the complexity of indirect rates, creating a challenge for customer **transparency**, especially in the year following the changes. Over time, transparency to customers appears to have recovered as RDECOM has become more

experienced at explaining their policies and customers have become more familiar with the policies (see Appendix D for a more in-depth discussion of these changes).

RDECOM's customers have experienced varying degrees of customer responsiveness. All customers indicated that RDECOM financial staff will answer questions about costs and prices. However, customers indicated that they had little influence on RDECOM's indirect costs and rates. Customers were especially concerned about costs and prices of hiring matrixed personnel, where they have relatively little discretion to hire outside of an RDECOM research, development, and engineering center (RDEC). Chapter 6 discusses ways that (near) full cost recovery can be made more responsive to customers.

As with the WCF, (near) full cost recovery potentially results in large **price impacts on customers** creating dysfunctional **customer incentives** resulting in death spirals. For example, RAND Arroyo Center estimated prices for ATEC's MRTFBs could increase by more than 130 percent under this model (see Appendix J) due to the MRTFB's large capital costs and indirect costs from sustainment. However, the additional flexibility of the cost rules for this model over the WCF could allow the Army to provide appropriations for some capital and sustainment costs to mitigate price increases, avoid death spirals, and preserve or invest in capabilities.

As with all reimbursable models, (near) full cost recovery has high **auditability** requirements and may require 18 types of KSDs.[6] However, (near) full cost recovery can utilize direct charge, and this may reduce auditability requirements on suppliers to 11 types of KSDs. (Near) full cost recovery is least compliant with the OUSD(C) requirement to reduce reimbursables. Most civilian labor costs are funded through reimbursables, and it is not exempt from the policy, as the WCF is.

## Appropriations for Indirect Costs

Appropriations for indirect costs provides the best alignment of incentives for underutilized capabilities and the only feasible reimbursable model for MRTFBs without changes in laws, regulations, and policies. However, under this model indirectly funded activities can be less responsive to customers. Customers cannot use their funding as leverage to shape the behavior or performance of the indirectly funded activities, and appropriations for indirect costs constrain suppliers from budgeting indirect costs in a way that best serves customer needs.

### *Strengths*

The need for **compliance with laws, regulations, and policies** will prevent ATEC's MRTFBs from moving to an alternative requiring the recovery of indirect costs barring a major policy change (i.e., rescinding Section 232 of the FY 2003 NDAA). A related benefit of this

[6] In addition, any appropriations received such as RDECOM's S&T appropriations may require 13 types of KSDs.

model for ATEC's MRTFBs is that the model is standardized across DoD—Air Force and Navy MRTFBs use the same model with governance by the same rules to fund MRTFB activities, which helps increase **transparency** and **appropriateness**.

Customers' **transparency** and **appropriateness** concerns are minimized in appropriations for indirect costs since customers do not pay for indirect costs. The appropriations for indirect costs model can potentially lead to the best alignment of visibility and costs, since customers can more easily monitor the direct costs that they pay for, while stakeholders in HQDA can monitor indirect costs that are difficult for customers to see or understand. A related benefit is the **stability of customer costs** is higher for the appropriations for indirect costs model than the previous models. Since customers do not fund indirect costs, changes in practices do not create winners and losers, except when suppliers shift costs between direct and indirect.

Appropriations for indirect costs provides the highest **sustainability of low-demand capabilities**, whereas the other reimbursable models incentivize suppliers to divest of low-demand capabilities because they burden customers with high indirect costs. This was an important consideration behind the decision to make military departments pay for the indirect costs of MRTFBs. Some MRTFB capabilities are unique and may be used occasionally depending on program development cycles. This feature could be counterproductive, however, in cases where there is little reason for the Army to sustain low-demand capabilities. For example, RTC expressed worry that appropriations for indirect costs could impede its ability to divest of unneeded capabilities since divestment is relatively difficult at MRTFBs under this funding model.

Appropriations for indirect costs produces the best **customer incentives** for underutilized capabilities because the model comes closest to charging customers for marginal costs only.

### *Weaknesses*

Appropriations for indirect costs is less **responsive to changes in workload** because appropriations do not necessarily track customer needs. Some indirect costs are variable costs that depend on workload, but appropriations for those costs are unlikely to track workload, potentially leading to underfunding of indirect costs when workload increases and overfunding when workload decreases. The lack of alignment between workload and indirect costs reduces **supplier incentives** to balance the costs and benefits of indirect spending; instead, suppliers are incentivized to maximize funding for indirect costs. Although customers would no longer care about the **transparency** of indirect costs, the appropriations for indirect costs model could reduce transparency of indirect costs to suppliers and HQDA. For example, managers at the Yuma Test Center (YTC) indicated that they lacked visibility into how cuts to indirect spending could impact capabilities. To generate equitable indirect rates, for example, the AMC CONOPS requires a detailed mapping of how indirect activities benefit direct activities.

Just as with (near) full cost recovery, the appropriations for indirect costs model has high **auditability** requirements since reimbursables may require 18 types of KSDs. Further,

appropriations received to pay for indirect costs may require 13 types of KSDs. Appropriations for indirect costs can also utilize direct charge, and this may reduce auditability requirements on suppliers to 11 types of KSDs. Appropriations for indirect costs is more compliant with the OUSD(C) request to reduce reimbursables than (near) full cost recovery since it funds indirect civilian labor with appropriations.

## Full Appropriations

Full appropriations excels over reimbursables in financial and accounting issues. However, its deficiencies make it inappropriate for customer-supplier relationships.

### *Strengths*

The strength of full appropriations centers on the accounting concerns of auditability, transparency, and appropriateness. Based on Deloitte's **auditability** assessment, appropriations may require slightly less audit evidence and slightly more internal controls over financial reporting and financial systems than models using reimbursables; this alternative may require only 13 types of KSDs to be auditable, whereas reimbursables may require 18 types of KSDs and the WCF may require 17 types of KSDs.

First, full appropriations eliminate many **transparency** and **auditability** issues that arise when funds are transferred between organizations.

Second, full appropriations reduce the need for suppliers to be financially **transparent** and use customers' funding appropriately. Many customers' concerns with RDECOM were a result of RDECOM evolving their cost accounting practices in accordance with the AMC CONOPS. As an example, TARDEC implemented the CONOPS in their Systems Engineering Directorate in FY 2017, increasing the number of indirect rates from one to six as each branch had its own indirect rate.[7] Implementation of the CONOPS increased the appropriateness of TARDEC's indirect assessments since customers who demanded capabilities with higher indirect costs paid more. But its complexity confused customers. The changes also realigned indirect costs inappropriately treated as direct costs, such as management supervision time, and recovered them from indirect cost pools instead. In a full appropriations model, customers pay nothing, so they do not require transparency or appropriateness from their suppliers.

Third, full appropriations would eliminate the temporary underreporting of disbursements of ATEC's appropriations to fund reimbursable contractor support labor since customers' funding would never be transferred to ATEC's appropriations—customers would pay nothing.

Fourth, reimbursables enable commands to engage in inappropriate "cost transferring" between appropriations and reimbursables. As an example, RDECOM's Budget Activity (BA)

[7] Appendix D discusses these changes in greater detail.

6.6 appropriations for indirect costs nearly halved between FY 2016 and FY 2017, and RDECOM increased indirect rates to customers rather than cutting its indirect costs. RDECOM and ATEC have cited similar examples from Army organizations that support them. For example, as IMCOM's appropriations decreased, IMCOM reduced common levels of service for activities like lawn mowing and trash pickup and required customers to pay if they want to maintain the previous level of services. Thus, reimbursables create a shell game where cuts to appropriations are funneled to customers who are left paying the bills. Full appropriations prevents this behavior because there are no customers to shift the bill to through reimbursables.

### *Weaknesses*

Full appropriations solves many concerns regarding reimbursable practices. It seems to perform well on many criteria. However, when RAND Arroyo Center considered a wider array of criteria including potential mission impacts, full appropriations appears inappropriate for use in RDECOM's and ATEC's customer-supplier relationships.

Full appropriations reduces the **incentives for customers and suppliers** to behave efficiently and effectively. Services are free to customers, creating an incentive to overdemand services. Suppliers need to ration their limited capacity, but there are few incentives for their rationing mechanisms to be responsive to the needs of customers since suppliers' funding is not linked closely to customer satisfaction as it is with reimbursable funding.

The **transparency** of costs to the supplier and HQDA would likely decrease because full appropriations requires the least fidelity in cost data; for example, suppliers may no longer need to separately measure direct and indirect costs, reducing the ability of HQDA stakeholders to monitor the suppliers' efficiency.[8]

Customers' current concerns about the **transparency** and **appropriateness** of the prices they pay would morph to concerns that suppliers no longer had **incentives** to be responsive to customer needs. Customers' concerns about prices potentially provide pressure toward achieving efficiency. In the absence of customer concerns, suppliers must work with stakeholders in HQDA to determine the right level of appropriations to meet projected customer needs—unlikely to be as effective given HQDA's reduced transparency.

PEO personnel expressed concern that moving to a full appropriations model would reduce the suppliers' responsiveness to customers since the suppliers would be ensured of the funding regardless of performance. They fear that a shift to full appropriations that would shift their

[8] The Congressional Budget Office (2007) found that Navy shipyards "reduced the amount of cost data available to Navy headquarters personnel and the Congress" when they shifted from a WCF model to a mix of full appropriations and appropriations for indirect costs (p. 2). They found that costs could theoretically be tracked to the same level of detail as they were in a WCF, but there is no requirement to track costs at that level of detail in models that rely heavily on appropriations.

appropriations to the suppliers would make it difficult to make up for gaps that arise due to suppliers reduced responsiveness—for example, by hiring contractors to fill in for the suppliers.

The White Sands Missile Range (WSMR) Fast Burst Reactor (FBR) provides a useful case study of dysfunctional incentives that may result from full appropriations, especially when suppliers with similar capabilities use different funding models. As an MRTFB capability, the FBR does recover some of its costs from customers, but ATEC's indirect costs (about $7 million, mostly for the security force) overshadow its direct costs (about $450,000 in FY 2017). The Department of Energy (DOE) shuttered or reduced the capacity of reactors at its national laboratories in recent decades and is now a major customer at the FBR. The reduction in non-Army capabilities has most likely occurred because the Army's FBR is nearly free to DOE, whereas DOE had to pay full costs of its own reactors, providing it with a large incentive to disinvest. According to FBR management, the uniqueness and importance of the FBR for upcoming Air Force and Navy programs is creating a demand for investments in capability and capacity beyond those needed for Army programs.[9]

Therefore, full appropriations can potentially underprice more expensive "competition" out of business, and this may eventually lead customers to demand investments to increase capacity. All DoD MRTFBs currently have the same pricing model, requiring customers to pay direct costs. If the Army began subsidizing direct costs through a full appropriations model, it would incentivize customers to shift business to the Army's MRTFBs when possible.

Full appropriations would likely reduce significantly the **adaptability to changes in demand** of RDECOM and ATEC. Annual budgets would set the total amount of work each command could perform, both using Army civilians and contractors. Suppliers would need to predict customer needs in advance to request funding through the DoD programming and budgeting process. These budgets could constrain the purpose of the work since RDT&E appropriations are often broken into numerous Program Elements (PE), thus making it difficult for the commands to adjust their priorities outside the programming and budgeting process. In contrast, reimbursables give the supplier more adaptability to respond to surprises in the year of execution by adding funds that the supplier can use to access personnel needed when new work materializes.

Customers currently can, in effect, increase the priority accorded to fulfilling their needs by paying for overtime and/or additional contractor labor. However, under full appropriations, total costs cannot exceed the amounts budgeted and appropriated, requiring careful planning and forecasting by the suppliers.

ATEC managers were particularly concerned that full appropriations would reduce their capacity to respond to changes in customer demands. Test centers rely on overtime to increase range capacity. In addition, under MRTFB policy and the appropriations for indirect costs model, customers who cancel or delay a test can be charged for the costs of the cancellation or delay, so

[9] Use Case #5 in Appendix K discusses the FBR example in greater detail.

some managers believe that customers would be more likely to cancel or delay tests under the full appropriations model. If test delays increased, range capacity could potentially decrease if other tests could not be rescheduled to fill the gap created by the cancellation.

Full appropriations can also result in inappropriate investments. If appropriations are too low, they can hamstring suppliers' ability to invest; if appropriations are too high, they may result in wasteful investments. (Near) full cost recovery and the WCF tend to incentivize prudent investment decisions, because suppliers must ultimately charge customers for most investments.

## Summary: Recommended Funding Models

This section summarizes the strengths and weaknesses of the funding models and provides the study team's recommendations for funding models for RDECOM, ATEC's MRTFBs, and ATEC's non-MRTFB test capabilities.[10] Table 5.2 provides a summary of these recommendations. *RAND Arroyo Center recommends improving the current funding model at RDECOM and ATEC by implementing improvements discussed in the following chapter.* Should the Army decide to pursue an alternative funding model, Appendix I discusses the transition steps the study team identified necessary to implement alternative models.

**Table 5.2. Summary of Recommendations**

| Alternative | RDECOM | ATEC MRTFB Test Capabilities | ATEC Non-MRTFB Test Capabilities |
|---|---|---|---|
| Working capital fund | Feasible but has drawbacks | Not feasible: Requires policy/law change | Feasible for RTC but has substantial drawbacks |
| (Near) full cost recovery | Recommended: Reform current practices | Not feasible: Requires policy/law change | Recommended: Reform current practices |
| Appropriations for indirect costs | Feasible but has drawbacks | Recommended: Reform current practices | Feasible but has drawbacks |
| Full appropriations | Inappropriate for customer-supplier relationships | | |

### *RDECOM*

RAND Arroyo Center recommends that RDECOM continue to operate within the (near) full cost recovery model. It is a model that has the potential to be responsive to customers yet has the flexibility to accept appropriations, enabling it to engage in activities beneficial to the Army,

[10] RAND Arroyo Center based these recommendations on the study team's assessment that identified the strengths and weaknesses of the models when assessed against the criteria. We note serious drawbacks of some of the models we assessed to make them infeasible or undesirable for the Army. For alternative funding models that are feasible, we assessed the gains of the alternative would likely be small and outweighed by the weaknesses we identified and by the efforts and risks (e.g., possible unintended consequences) of transitioning to a different funding model.

such as conducting research with a long-term payout. RDECOM is an adaptive organization that shifts priorities and divests of obsolescent capabilities; thus, (near) full cost recovery pricing comes close to reflecting marginal prices, providing proper incentives to customers and suppliers. RDECOM is addressing many stakeholder concerns through their AMC CONOPS implementation. CONOPS implementation has caused turbulence, such as the price surprises experienced by some customers, but this turbulence will likely smooth over time as customers and stakeholders become more familiar with the CONOPS. Chapter 5 provides additional recommendations for further improvements, such as improving responsiveness to customers and stakeholders.

The largest benefit of the WCF is that it provides a standard set of processes and governance, whereas the AMC CONOPS applies to AMC only. Transitioning to the WCF would create a risk of death spirals as price increases led to decreases in demand. However, RAND Arroyo Center estimates average prices at RDECOM could increase by about 17 percent. Another risk of the WCF is to RDECOM's appropriations for mission activities, which help them grow capabilities. Under the WCF, these appropriations would be reallocated to customers who may be more focused on executing research at the lowest price than on investing in the future.[11]

The main benefit of appropriations for indirect costs is that it would likely reduce many of the concerns that customers have about the transparency and appropriateness of indirect costs. However, it would not necessarily reduce Army concerns, since the Army would still need to fund those costs using appropriations. Oversight from HQDA for indirect costs may be more effective at creating supplier incentives for efficiency than oversight from customers, who have little visibility—but changes can be made to increase HQDA oversight in the current funding model (see Chapter 5). Appropriations for indirect costs would introduce some risk that RDECOM might not be able to obtain necessary indirect resources. For example, RDECOM's workload might grow, but appropriations might not. Appropriations for indirect costs would better support the sustainment of underutilized capabilities, but given RDECOM's focus on S&T, incentives to divest of unneeded capabilities and invest in cutting-edge capabilities, which (near) full cost recovery provides, are probably more prudent.

### *ATEC MRTFB*

RAND Arroyo Center recommends ATEC's MRTFBs continue to use the appropriations for indirect costs model. It is the only reimbursable model consistent with current law. Appropriations for indirect costs supports the long-term sustainment of underutilized

[11] The U.S. Naval Research Advisory Committee (*Status and Future of the Naval R&D Establishment*, NRAC Summer Study, September 2010) notes that a major drawback of the Navy WCF is that the Naval Warfare Centers receive very little S&T funding and that the Navy WCF incentivizes a near-term focus instead of the long-term focus needed of labs. Similarly, the Defense Science Board (*Defense Research Enterprise Assessment*, Washington, D.C.: Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, December 2017) recommends against relying solely on the WCF because of its lack of long-term focus.

capabilities, better ensuring that Army test capabilities are available for programs requiring them. ATEC's test centers generally have a one-size-fits-all approach where all capabilities within a test center are designated as inside or outside the MRTFB. This all-or-nothing designation of MRTFBs can create risks to highly utilized capabilities because ATEC cannot ask customers for additional funding for investments. In the recent past, ATEC grew non-MRTFB capabilities at a test center that is otherwise in the MRTFB. For example, YPG's counter-IED capabilities are not within the MRTFB and have benefited from customer investments and indirect costs funded by customers. Customers of other highly utilized capabilities could potentially benefit from those capabilities being moved outside the MRTFB, but this removal would require policy changes.[12] Chapter 6 discusses how increased flexibility to move capabilities outside the MRTFB and charge customers a larger share of costs for highly utilized capabilities could be a desirable improvement but would also require policy changes.

Section 232 of the FY 2003 NDAA must be repealed to move ATEC's MRTFBs to (near) full cost recovery or the WCF. Either (near) full cost recovery or the WCF would shift ATEC's incentives from the sustainment of test capabilities necessary over the long run toward divestment of lesser needed capabilities that impose high indirect costs and would raise prices for customers. WCF rules do not allow MRTFBs to charge capital investment costs to customers, who are paid by appropriations.[13] Even if MRTFBs do not charge capital investment costs to customers, there could still be a significant risk of death spirals since test capabilities require high levels of indirect spending for sustainment. RAND Arroyo Center estimates significant increases in prices in the WCF (nearly a 200 percent increase at ATEC's MRTFBs; see Appendix J). In the short run, divestment of MRTFB capabilities could lower the Army's costs, but in the long run it could be costly if the Army had to reconstitute test capabilities or was unable to conduct tests, increasing risks to programs.

Even if Section 232 of the FY 2003 NDAA were repealed, (near) full cost recovery for all the MRTFBs is unattractive because it would increase ATEC's reimbursables—contrary to OUSD(C) guidance—and would do little to solve other accounting issues such as the underreporting of ATEC's disbursements for contractor cost allocations to the OSD. Further, it could increase prices significantly (an increase of more than 130 percent, according to the study team's estimates in Appendix J), risking death spirals.

[12] The U.S. Department of Defense (*Management and Operation of the Major Range and Test Facility Base [MRTFB]*, Washington, D.C.: U.S. DoD, Department of Defense Instruction Number 3200.18, February 1, 2010, revised November 15, 2017), which governs the composition of MRTFBs, has no provision to remove highly utilized capabilities.

[13] FMR, Vol. 2B [020104E1].

### *ATEC Non-MRTFB*

RAND Arroyo Center recommends ATEC's non-MRTFB capabilities remain in (near) full cost recovery. As at RDECOM, (near) full cost recovery is a model with flexible rules that can incentivize suppliers to be responsive to customers and to divest of unneeded capabilities. (Near) full cost recovery has the flexibility to provide appropriations to suppliers, which can help cover fixed costs and charge customers prices closer to marginal cost. In Chapter 5, the study team provides recommendations for RTC to adopt elements of the AMC CONOPS, which could help increase transparency by standardizing (near) full cost recovery terminology across the Army.

Non-MRTFB capabilities are not governed by MRTFB policies; hence, the Army has greater flexibility to choose a funding model than it does with ATEC's MRTFBs. Shifting non-MRTFB capabilities located at MRTFB ranges to the WCF is unlikely to be feasible since they are such a small share of the workload at those ranges. The WCF is likely to be feasible at RTC. The chief benefit of the WCF over (near) full cost recovery is it would move these capabilities to a standardized set of processes and governance common across DoD, which can help with transparency. There are several potential drawbacks of moving RTC into the WCF. Most notably, the WCF possesses less flexible rules regarding nonreimbursable funding sources—RTC receives about $10 million each year in appropriations supporting its indirect operations, plus additional appropriations for capability investments. RAND Arroyo Center estimates that RTC's prices would increase by about 70 percent if moved to the WCF, increasing the risk of death spirals and incentivizing divestment in capabilities the Army benefits from in the long term. Another significant downside of the WCF is RTC is a small share of ATEC, a command possessing no WCF experience. It may not be worthwhile to incur the transition costs of shifting only a single range into the WCF.

Moving ATEC's non-MRTFB activities to appropriations for indirect costs is a feasible option, but the Army has chosen to keep RTC and other non-MRTFB test capabilities outside the MRTFB, who would impose this funding model. The MRTFB seeks to preserve unique capabilities while military departments have more flexibility to divest of non-MRTFB capabilities.[14] Appropriations for indirect costs would reduce reimbursable funding, but major drawbacks include the risk that appropriations for indirect costs would not be responsive to the needs of the range's customers and a potential reduction in incentives to spending indirect funding efficiently.

[14] For example, missile capabilities also exist at YPG and WSMR, and they are designated as MRTFBs.

# 6. Improved Accounting Practices

RAND Arroyo Center identified possible improvements to accounting practices at RDECOM and ATEC based on the concerns identified with reimbursables and our explorations of current practices at the two commands.[1] Table 6.1 shows how each of these recommendations applies to the activities at both commands. For RDECOM, many of these recommendations build on recent efforts to establish and implement the AMC CONOPS that standardizes reimbursable processes. We found that recent efforts at RDECOM (i.e., leading to the development of AMC CONOPS) are moving them toward a full cost recovery system that charges customers appropriately (i.e., equitable, legal, and legitimate) for indirect costs. However, we have not performed a comprehensive audit, so overall compliance with the CONOPS is unclear. Based on our discussions and data analysis of RDECOM's indirect budgeting processes, it is clear that indirect budgeting and controls are evolving.

**Table 6.1. Recommended Improvements**

| Improvement | RDECOM | ATEC MRTFB | ATEC Non-MRTFB |
|---|---|---|---|
| 1. Involve customers/HQDA in indirect budget development | ✓ | | ✓ |
| 2. Require detailed disclosures of cost accounting practices[a] | ✓ | | ✓ |
| 3. Require consistency in how costs are funded for disclosures[a] | ✓ | | ✓ |
| 4. Eliminate RDECOM's BA 6.6 appropriations for indirect costs | ✓ | | |
| 5. Standardize reporting of indirect rates and costs to customers on DD 1144 forms[a] | ✓ | ✓ | ✓ |
| 6. Include indirect budgeting methodologies in guidance documents | ✓ | ✓ | ✓ |
| 7. For RTC: Create a cost accounting guidance document that adopts elements of AMC Reimbursable CONOPS | | | ✓ |
| 8. Apply indirect rates to contractor support | ✓ | | |
| 9. Budget and track execution of indirect costs at a high level of granularity | ✓ | ✓ | ✓ |

[a] See Appendix L for additional details about these recommendations.

[1] Appendix L elaborates on some of these potential improvements to RDECOM's and ATEC's accounting methods in greater detail. Appendix L also discusses two potential recommendations the study team considered but did not recommend, and we characterize these as future challenges and discuss in the next chapter.

## Improvement #1: Involve Customers and HQDA in Development of Indirect Budgets for Organizations Recovering Indirect Costs from Customers

Our investigation of indirect budgeting processes found that customer involvement in indirect budgeting processes is informal. Customers feel providers are open and responsive to answering questions about the composition of indirect rate pools, but customers feel they are being told "these are the rates" without formal input. Providers and their chains of command appear cognizant of the need to operate indirectly funded activities efficiently to keep prices low for customers, but the lack of formal input appears to erode trust.

An indirect rates board could provide a high level of oversight for indirect budgeting processes. The Army G-8 and Army Budget Office already operate an oversight board for the AWCF that could potentially serve as a model for an indirect budgeting board. The AWCF Requirements Review Group (ARRG) has oversight and cost control responsibilities. Membership of the ARRG includes representatives from throughout the Army, including supplier representatives from HQ AMC, customer representatives from the Assistant Secretary of the Army (Acquisition, Logistics and Technology) (ASA[ALT]) (where the Army's PEOs and program managers [PMs] are located), and other stakeholders from the Army Staff and Secretariat.

Another option (similar to how DoD manages indirect rates with its contractors) is by creating a neutral-party interface between the supplier and the customer. The Defense Contract Management Agency (DCMA) provides administrative contracting officers (ACO) who are typically located on-site at a large contractor's location and can therefore develop a deep understanding of the contractor's business processes. They have the authority to negotiate and approve indirect rates with the contractor and determine the reasonableness of indirect costs. Program officers can interact with these representatives, thus reducing the amount of understanding that the program officers need to develop (see Chapter 8 in Cash [2001] for a more complete discussion of these roles). RDECOM, AMC, RTC, and ASA(ALT) could potentially develop roles similar to the ACO that would develop deep understanding of the suppliers' business practices and facilitate interactions between suppliers and customers. An advantage of this ACO-like role would be that it would facilitate a detailed understanding of the supplier's practices, whereas a rates board like the ARRG will primarily rely on high-level data inputs from the suppliers and be left to trust the accuracy of those submissions. The neutral-party interface could provide a deep level of verification.

Instituting an indirect rates board or a neutral-party interface for RDECOM and RTC could provide customers additional transparency and a seat at the table, when indirect budgets are

approved. Such mechanisms should increase trust by involving representatives who are looking out for all customers' interests rather than the narrow interests of individual customers.[2]

ATEC's MRTFBs could potentially benefit from increased oversight, but they already have oversight from the Deputy Under Secretary of the Army for Test and Evaluation (DUSA-T&E) and the Test Resource Management Center (TRMC). Further, they do not charge indirect rates to DoD customers, so gains could be marginal unless they move toward a full cost recovery alternative.

## Improvement #2: Require a Detailed Disclosure of Cost Accounting Practices from All Provider Organizations

Currently RDECOM and ATEC provide high-level guidance on cost accounting policies and rules. This high-level guidance is not sufficient for an outsider like a customer, rates board, or a neutral party to understand the actual practices as implemented by each organization and to ensure that these practices align with the policies. The disclosure would provide details about the names and purposes of each cost pool and specifics about how they are used to build rates.[3] Such a disclosure would increase internal transparency by documenting what is currently in people's heads or emails and would provide greater understanding of GFEBS and FIRE.

The Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE) is seeking information to justify the indirect rates in GFEBS. DASA-CE enters rates into GFEBS using a template for commands to set their indirect rates and the rules regarding which direct costs are assessed with indirect rates and where indirect recoveries are transferred. In FY 2018, DASA-CE created an expansion of the template requiring commands to provide a narrative to justify these transfers and to explain how the rates were calculated. This information potentially forms the core of a detailed disclosure of cost accounting practices when placed in a more user-friendly format and supplemented by additional details (e.g., what costs are direct versus indirect and the purpose and composition of each cost pool).

[2] Determining the appropriate level of detail to review indirect budgets will require iteration over time to find the right balance. Reviews at too detailed a level would likely be so time consuming that the benefits of such a review could outweigh the costs. However, reviews cannot be constrained to an aggregate level—they must have the ability to drill into details to answer customer and stakeholders' questions and build trust.

[3] A model for such a disclosure could be the Cost Accounting Standards Board (CASB) Disclosure Statement where government contractors must detail their cost accounting practices. We discuss this disclosure statement in greater detail in Appendix L.

## Improvement #3: Require Consistency in How Costs Are Funded for Disclosure of Cost Accounting Practices

When costs are funded from multiple sources, it allows suppliers to transfer costs to customers when appropriations are cut. RDECOM can fund its indirect costs with BA 6.6 appropriations or indirect assessments to customers and has increased indirect rates for its customers as BA 6.6 appropriations have been cut. RTC receives $10 million of developmental testing appropriations it uses to fund labor in command staff functions benefiting the entire cost center. If the $10 million were cut in an efficiency-finding[4] exercise, RTC would likely transfer those costs to its customers, as RDECOM has done.[5] The risk of cost transferring would be reduced by requiring a single source of funding for any type of costs.

As an example, RTC could clarify in its disclosure which indirect cost pools were funded exclusively with indirect recoveries from customers and which indirect cost pools were funded exclusively with appropriations. If appropriations were cut, RTC would need to cut the activities funded by the appropriations. Otherwise, RTC would need to modify its disclosures to shift costs to its customers so that the cost transferring is transparent to customers and stakeholders, and—assuming that Improvement #1 (customer and HQDA involvement in indirect budgeting) were enacted—would have buy-in from customers and stakeholders.

The AMC CONOPS and RDECOM's policies also lack a similar delineation of which costs should be paid using appropriations and which costs should be paid through reimbursable charges to customers. According to RDECOM management, their detailed tables of distribution and allowances (TDAs) indicate which positions are funded by the BA 6.6 appropriations (RAND Arroyo Center did not review detailed TDAs to confirm), but the AMC CONOPS lacks guidance on which TDA positions should be paid by appropriations and which should be paid by indirect recoveries from customers. A detailed disclosure of indirect cost practices could help fix this problem.

In contrast to the (near) full cost recovery organizations, MRTFBs have a strong delineation of which costs should be paid by whom since this issue is at the heart of the FY 2003 NDAA MRTFB funding policies.

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[4] Cost accounting policies could also aim to fund costs *efficiently* by charging customers for marginal costs and funding fixed costs with appropriations. Appendix L discusses these potential considerations in more detail.

[5] RTC seems at a high risk of cost transferring should their $10 million of appropriations ever be cut. RTC's cost accounting policies (see Appendix B) and its indirect budgeting processes (see Appendix C) are informal—ATEC 37–11, which sets policies for the MRTFB test centers, does not apply to RTC. As Table B.3 indicates, only some costs in the RTC's Center Support Directorate are paid using these appropriations. There is no clear delineation of what costs should be paid with appropriations and which should be paid using indirect recoveries from customers; hence it seems likely that a cut in RTC's appropriations would lead to a similar-sized increase in indirect recoveries from customers.

## Improvement #4: Eliminate RDECOM's RDT&E BA 6.6 Appropriations for Indirect Costs and Shift the Funding to Customers

In FY 2016, RDECOM received $27 million in appropriations for indirect costs[6] and collected an additional $391 million in indirect recoveries paid by customers and $207 million of indirect recoveries paid by mission appropriations.[7] The ability to fund the same costs through two different sources (indirect collections and BA 6.6 appropriations) leads to a high risk of cost transferring and appears to be inconsistent with the spirit of the AMC Reimbursable CONOPS.[8] If the Army wants to immediately eliminate the risk of these cost transfers, RDECOM's BA 6.6 appropriations should be shifted to its customers. Alternatively, the Army could implement Improvement #3 at RDECOM by standardizing the indirect costs the BA 6.6 appropriations fund, then reevaluating the risk of cost transferring.

## Improvement #5: RDECOM/AMC and RTC Should Standardize the Reporting of Indirect Rates and Costs to Customers

The Army uses Directives Division (DD) Form 1144, Interservice Support Agreements, to establish agreements between customers and suppliers about the scope and costs of reimbursable workload. Customers and HQDA use the information reported on the DD 1144s to gain an understanding of cost accounting practices. At RDECOM, for example, data from the DD 1144s can be used to calculate the average labor cost of a project or service, which will be unique for each effort because each effort has a unique mix of different types of personnel. The average labor cost may be misinterpreted as a unique indirect rate for each effort, even though RDECOM's indirect rates for each cost pool are being consistently applied.[9]

RDECOM and ATEC both indicated they provide much more detailed information to customers when negotiating 1144s. RDECOM's FIRE system can automate reporting of indirect rates and direct/indirect costs. The challenge for RDECOM and RTC will be in working with customers to discover a format that will meet their needs and provide a higher level of

[6] RDECOM also receives BA 6.6 appropriations for mission work. This recommendation only pertains to RDECOM's appropriations for indirect costs that are contained in PE 0605801A, "Programwide Activities" (see Appendix D).

[7] RDECOM's appropriations for indirect costs decreased to about $17 million in FY 2017. See Table D.2 in Appendix D for details of how RDECOM's BA 6.6 appropriations changed between FY 2014 and FY 2017.

[8] The CONOPS excludes costs that are funded through appropriations, such as the personnel funded by the BA 6.6 appropriations, from being included in indirect cost pools. Therefore, the CONOPS appears to permit RDECOM to accept these appropriations. However, accepting these appropriations appears to violate the spirit of the CONOPS, which says, for example, that costs that benefit an entire organization should be Tier 1 indirect costs that apply to the entire organization.

[9] Table L.4 and the surrounding discussion in Appendix L provide an example of the information that the DD 1144s provide and how this can lead to misinterpretations.

transparency. ATEC provides standardized, detailed reporting of estimates of direct costs when negotiating the scope of work but does not need to report indirect rates since DoD customers of MRTFBs do not pay for indirect costs. No standardized form can ever answer all questions, but they can provide a mechanism for building confidence and understanding among providers, customers, and headquarters stakeholders.

## Improvement #6: RDECOM and ATEC Should Include Indirect Budgeting Methodologies in Guidance Documents

RAND Arroyo Center found that RDECOM's indirect budgeting processes are maturing but that RDECOM has not documented those budgeting processes sufficiently. Documentation in the AMC CONOPS would help improve transparency about processes with customers, HQDA, and outsiders like RAND. In addition, it would help ensure standardization and transmission of best practices. ATEC documents its MRTFB processes (but not processes at RTC) through PowerPoint slides that ATEC could formalize by including within ATEC 37–11 (Standard Rate Management).

## Improvement #7: RTC Should Create a Cost Accounting Guidance Document and Adopt Elements of the AMC Reimbursable CONOPS

It is challenging for customers to understand different indirect rate structures. AMC's CONOPS is making improvements by standardizing across RDECOM. RTC uses a similar recovery structure but expresses the system less clearly than the CONOPS. Further, RTC does not have a cost accounting guidance document like ATEC's MRTFBs (ATEC 37–11) or the CONOPS. RTC should create a formal guidance document that leverages similar terminology from the AMC CONOPS[10] to increase transparency. In the long term, by adopting common terminology and definitions across Army commands, RDECOM and ATEC can help define Army-wide reimbursable standards and methods.

## Improvement #8: RDECOM Should Apply Indirect Rates to Contractor Support as well as Civilian Labor Hours

ATEC applies indirect rates to both civilian and contractor labor hours. RDECOM does not charge indirect rates to contractor efforts, which makes contractor labor appear artificially cheap, even though contractors share office space with civilians and impose burdens on RDECOM's

[10] RDECOM could easily adopt the AMC terminology by (1) renaming its Center Support Directorate rate to a "Tier 1" rate, (2) renaming its Low Rates to "Tier 2" rates, and (3) calculating "Tier 3" rates as the difference between the current low rate and high rates.

management. The Engineer Research and Development Center (ERDC, the U.S. Army Corps of Engineers [USACE], laboratory organization) recognized that mispricing of contractors was a problem due to its contractor-heavy laboratory workforce and implemented the "flat-rate burden" (described in detail in Appendix F), charging indirect rates as a percentage of direct costs.

RDECOM does not track contractor labor hours like ATEC, but they could charge indirect rates as a percentage of contractor labor costs.[11] By increasing the base over which indirect costs are spread, this policy would reduce the indirect rates currently charged on RDECOM's civilian labor hours.[12]

## Improvement #9: Budget and Track Execution of Indirect Costs at a High Level of Granularity to Relate Indirect Budgets to GFEBS Execution Data

Based on the exploration of RDECOM's indirect costs (see Appendix D), RAND Arroyo Center concludes RDECOM needs to produce better visibility on how its indirect recoveries are spent. This improvement would standardize indirect cost categories and allow indirect budgets to be validated using execution data from GFEBS.

At present, RDECOM creates indirect budgets in FIRE with a much higher level of granularity than they validate with GFEBS execution data, and this makes it difficult for customers, managers, and stakeholders to understand how indirect collections are spent. Ideally, the level of detail within FIRE budgets could be matched with outputs from GFEBS to understand how indirect cost execution diverged from initial forecasts.[13]

ATEC has implemented "statistical internal orders" in GFEBS to better track capability use/sustainment and indirect cost execution. These orders are used to track what capability with

[11] In discussions and correspondence, RDECOM has indicated they collect indirect fees on contractor workload and manually collect Section 219 as a percentage of funding. RDECOM raised concerns that collecting indirect rates as a percentage of spending on contractors would also have to be manual, thus leading to audit risks from human error. Automatic indirect rate collections as a percentage of cost are common in industry and a feature enabled by SAP, the software on which GFEBS is built, and included as an option in DASA-CE's cost sheets and the AMC CONOPS. Further, ATEC collects unfunded civil service retirement costs to nongovernment customers as a percentage of labor costs in GFEBS. However, RAND Arroyo Center has been unable to establish what cost bases are currently supported in GFEBS; based on our conversations, we conclude there is a high level of uncertainty about what capabilities GFEBS currently supports, what capabilities it could support with better training, and what capabilities would require investments in GFEBS to implement. Thus, there are potential impediments to implementing these charges.

[12] Appendix J calculates that if an indirect rate of about 12 percent were assessed to RDECOM's contracts, average indirect rates at RDECOM would decrease from about $29 per DLH to about $12. This indirect rate is on the high end since many contracts—especially pass-through contracts—likely impose relatively few indirect costs on RDECOM, so they would be loaded with a lower indirect rate.

[13] Appendix D looks in detail at indirect cost growth at RDECOM and shows how much precision could benefit RDECOM management and Army stakeholders and customers.

which indirectly funded work is associated and to track efforts that are not associated with a specific capability (e.g., ATEC tracks training and the support they provided for this research study). Similarly, RDECOM could use statistical internal orders in GFEBS to better track costs to indirect budgets in FIRE. Ultimately, both commands could use work breakdown structures (WBS) to better track execution of indirectly funded efforts. For example, RTC is currently using a WBS to budget its indirect cost pools and monitor execution.[14]

[14] Some organizations have expressed reservations about how GFEBS implements WBS structures. For example, personnel at YTC explained that they have encountered double counting, and this has prevented them from using WBS structures to track indirect costs. It is unclear to what extent these issues are due to limitations in GFEBS and to what extent they are due to insufficient training or knowledge of GFEBS.

# 7. Remaining Challenges and Analyses

Through the course of the study, RAND Arroyo Center identified other areas where the Army could make improvements to existing reimbursable processes but where additional research or investments would be necessary to chart a path forward.[1] Several of the Army stakeholders with whom we regularly met are actively working on these challenges. These challenges do not lend themselves to easy answers because they involve trade-offs across the Army. Table 7.1 summarizes these challenges.

**Table 7.1. Remaining Challenges and Analyses**

| Challenges and Analysis | RDECOM | ATEC MRTFB | ATEC Non-MRTFB |
|---|---|---|---|
| Improve direct charge reporting processes and GFEBS | ✓ | ✓ | ✓ |
| Improve ATEC's disbursement reporting for contractor cost allocations | | ✓ | ✓ |
| Improve transparency of commitment items in GFEBS for cost allocations | ✓ | ✓ | ✓ |
| Apply indirect rates to bases other than labor | ✓ | ✓ | ✓ |
| Seek increased flexibility in funding MRTFB capabilities | | ✓ | |
| Obtain more precision in the costs/benefits of executing transition tasks | ✓ | ✓ | ✓ |

## Improve GFEBS and/or Reporting Processes so Direct Charges Are the Standard for Reimbursables

Direct charge is an alternative way customers may fund suppliers that has the potential to greatly reduce reimbursables, thereby increasing compliance with the OUSD(C) guidance. Direct charge can also increase customer visibility into the categories of costs where suppliers spend their funding because costs are incurred directly on the customers' funding. Further, Deloitte found direct charge may require the fewest KSDs of any alternative, thus minimizing the auditability burden on the supplier.

[1] As with the recommended improvements discussed in Chapter 6, most of these remaining challenges were identified as possible solutions to the perceived problems identified in the use cases (see Appendix L). However, the study team's analysis and discussions with stakeholders indicated implementing these changes requires additional study and/or policy changes that would delay implementation.

However, direct charge has several limitations. First, direct charge cannot be used on project orders, which are used for projects with fixed deliverables, such as tests at ATEC.[2] Changes to DoD policy would enable direct charge to be used for project orders.

Second, in our discussions, Army personnel indicated that HQDA lacks transparency into whose personnel are used to execute direct charge orders. Under current reporting procedures, the Army counts personnel by who owns the funding paying for the personnel. Under direct charge, the customer retains ownership of the funding, so the reporting gives credit to the customer for the personnel used even when the personnel belong to the supplier organization. Under reimbursable funding, funds are transferred from the customer to the supplier, so the supplier gets credit for using their personnel. To fix reporting issues for HQDA, the Army would need to standardize reporting requirements across the Army; ATEC has developed practices that could provide a starting point for those decisions.[3]

Finally, commands using direct charge have encountered issues with management rights. Whereas reimbursable funds are fully controlled by the supplier, the customer maintains control over funds for direct charges. Supplier organizations have had issues with customers removing funding and manipulating indirect rates on direct charge orders. Additional management controls are necessary to prevent direct charge customers from changing indirect rates without the provider's permission or pulling funding without the provider's knowledge; in contrast, reimbursable transfers give providers full ownership rights of the funding and prevent such behavior.

Efforts to overcome these limitations are ongoing. We had extensive discussions with personnel from the Office of the Deputy Assistant Secretary of the Army for Financial Operations (DASA-FO), who have been looking at these direct charge issues for several years and have recently looked at a path forward to make these improvements. Discussions with personnel in the Air Force also revealed they have been facing similar reporting issues as they contemplated instituting some form of direct charge or direct cite to increase the ability of customers to fund Air Force civilians. The study team was unable to identify a path to implement changes that would overcome these limitations; therefore, we consider direct charge improvements to be a longer-term challenge.

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[2] Currently the FMR prohibits the use of direct charge for project orders (FMR, vol. 11A [020519]). ATEC personnel indicate that orders for tests at ATEC are usually project orders. In contrast, RDECOM personnel indicate that they mostly use Economy Act orders that provide a level of service for a period of time (e.g., labor from engineering personnel to support a program manager).

[3] ATEC implemented process changes to improve the transparency of direct charges. Without modification, ATEC can use the GFEBS Detail Labor Management Report to report hours worked for all personnel across an organization. In addition, ATEC tracks the "Responsible Cost Center" field in GFEBS to indicate when an ATEC organization is responsible for executing a direct charge but is not the fund's owner. This allows anyone with GFEBS access to understand not only the status of funds that ATEC owns but also the status of funds that ATEC is responsible for executing.

## Seek Ways to Improve ATEC's Disbursement Reporting for Contractor Cost Allocations

One alternative funding model, the WCF, would fix this problem completely. Contracts under a WCF work similarly to how ATEC funds them today but without the disbursement reporting issues.[4] This process does not require the use of direct appropriations, so no underreporting of disbursements would occur.

However, the study team recommends against moving ATEC to a WCF model. Therefore, the Army must adopt other solutions to ATEC's reporting problem or continue to deal with the problem.

An option that RDECOM is exploring with the Army's auditor and that is receiving positive feedback is consolidated accounts. RDECOM and AMC are discussing the potential to accumulate multiple sales orders into consolidated accounts that could be used to make contractor payments without requiring separate contract modifications for each customer order. The commands are seeking advice from the Army's auditor about whether this practice is transparent and auditable. If allowed, ATEC could potentially cite its contracts against these accounts, which are funded by customer orders.

Alternatively, ATEC could fund its contracts on an incremental basis by citing each customer's orders as they arrive and performing a contract modification. Such a practice would be similar to most other Army organizations, but it would be at odds with ATEC's current practices—using hours worked reported in CIMS to allocate costs to customers. These contractor modifications would create additional workload for ATEC, and ATEC believes that the modifications could cause delays to testing.

Discussions with ATEC revealed two other possible, long-term options that would need considerable exploration to validate. First, the Army and OSD could improve disbursement reporting by stripping out the disbursement credits on appropriations when calculating disbursement rates. Second, the Army could institute a revenue account[5] that holds the disbursement credits, effectively "earning" revenue from customers that has not yet been paid to the contractors.[6]

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[4] If ATEC operated within a WCF, it would be able to cite the cash corpus in its large contracts. In a WCF, when contractors work on a test for a customer, funds would be transferred from the customer to ATEC's cash. During the lag between the time the contractor performs the work and disbursement to the contractor, the customer's funds would remain in ATEC's cash.

[5] The FMR permits exchange revenue accounts to be used for revenues WCF and appropriated fund activities receive in exchange for providing services (FMR, vol. 4 [160402C]).

[6] According to Deloitte, the auditor will likely conclude that ATEC is underreporting outlays, obligations incurred, and gross costs when the existing cost allocation process is used. Using separate general ledger accounts for revenues and costs (and their related transactions) are typically employed to avoid the underreporting that ATEC is experiencing. Thus, ATEC's underreporting is likely to result in an audit finding, but this finding, in and of itself,

## Improve Transparency of Commitment Items Used in GFEBS Cost Allocations

Cost allocations are used to allocate a common cost to a project or WBS task that directly benefits from that cost. For example, in GFEBS payroll is paid from cost centers, so cost allocations transfer costs to customers to credit payroll. ATEC, similarly, has large contracts to provide contractor test support personnel that are funded by customers through cost allocations. All other types of costs that are allocated to customers are aggregated together in one commitment item,[7] reducing transparency of costs.

Suppliers and customers have told us that they can query individual transactions to gain a better understanding of how the costs are spent (i.e., they could track the corresponding primary cost transaction). However, this level of manual intervention would be infeasible for any high-level analysis, and from our discussions, it was clear that many Army personnel with access to GFEBS do not possess the skills to conduct such detailed queries. Therefore, improvements to commitment items would help Army personnel understand both individual transactions and cost allocations across organizations.

## Consider Applying Indirect Rates to Bases Other than Labor Hours or Labor Costs

If indirect costs are generated by activities that use relatively little labor but indirect rates are only loaded on labor, labor-intensive projects can potentially pay a disproportionate share of indirect costs. Examples of other indirect cost bases that could improve allocations are dollars of funding (i.e., the base that Section 219 uses), capability hours, tests conducted, miles driven, and so on. Before a new base is used, however, the commands need to weigh benefits against increased complexity and current GFEBS limitations. For example, WSMR FBR personnel indicated they discuss the cost per hour of testing at the reactor when talking to customers; however, staffing at the reactor is standardized so the staffers say the common method of charging by DLH produces little variance in reactor cost per hour.

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should not impact the overall audit opinion. The severity of the audit finding will depend on the materiality of the net impact of these transactions to the financial statements.

[7] Payroll cost allocations use a commitment item of 9300L, contractor cost allocations use 9300C, and remaining costs use "All Object" (ALLOBJ) (which GFEBS most often uses to allot appropriations or reimbursable funding, thereby decreasing the transparency of these cost allocations). The most straightforward way of increasing transparency is for the Army to add additional commitment items in GFEBS that represent the most common allocations. For example, the most common allocations we heard in our discussions were for vehicle rentals and fuel. See Figure L.1 and the surrounding discussion in Appendix L for further details.

## Seek Ways of Increasing the Flexibility of Funding MRTFB Capabilities

The WSMR FBR case study raised several possibilities of how the Army could increase the flexibility of funding its MRTFB capabilities to increase the share of funding paid by customers.

First, MRTFBs can potentially shift some costs from indirect to direct when justifiable. For example, investing in a vault at the FBR to reduce security personnel costs when tests are not being conducted could be a potential way of substituting direct costs chargeable to customers for what are currently indirect costs, since high levels of security would only be needed when experiments were run for customers. FBR personnel think it is likely that such an investment will reduce overall security costs based on previous experiences in DOE. However, such a strategy would need to be careful to avoid raising overall costs for the government.

Second, responsibility for indirect funding of MRTFB capabilities with a broad customer base could be shifted to the OSD. For example, chemical/biological funding at Dugway and Edgewood are funded by the OSD. Shifting indirect funding responsibilities should also better align the interests and needs of customers with those of the funding provider. Third, MRTFBs could increase allowable charges to customers. Discussions with White Sands indicated the FBR security costs are not included in the indirect costs charged to commercial customers. Increasing charges to commercial customers would slightly reduce the Army's burden since 14 percent of reimbursable costs for the FBR come from outside the U.S. government.

Finally, some capabilities could be removed from the MRTFB to make customers responsible for more indirect costs. As mentioned earlier, this removal of healthy capabilities from the MRTFB would require policy changes as well as a reconsideration of the DoD's MRTFB funding model. FBR personnel indicated that they are significantly cheaper than the lower capacity alternative in the DOE, so their customers might be able to tolerate some price increases. The FBR is already close to capacity, so such increases could have the added benefit of better rationing FBR capacity to the customers who value it most. However, FBR personnel expressed doubts the FBR would remain competitive under full cost recovery since indirect costs are so high relative to the direct costs customers currently pay.

## Obtain More Precision in the Costs/Benefits of Executing Transition Tasks

The study team identified the steps necessary to transition to alternative funding models (Appendix I). RAND Arroyo Center recommends pursuing improvements to the current systems at the commands. However, if the Army decides to pursue an alternative funding model, additional research will be needed to obtain more precise estimates of the costs and benefits of executing the transition. Little information on these costs and benefits was available; hence, more detailed estimates would need to be developed during the transition, as discussed in Appendix I.

# Appendix A. RDECOM Funding Overview

This appendix summarizes data that RDECOM provided to RAND Arroyo Center throughout the course of the study, which provides a baseline of how RDECOM is funding its activities. RDECOM's organizations are listed in Table 2.1. Appendix D provides additional data analyses that focus on RDECOM's indirect costs, concentrating in detail on costs at one directorate in TARDEC.

## RDECOM Funding Sources

Table A.1 summarizes RDECOM's funding sources during FY 2016. RDECOM provided the study team with obligation data because RDECOM follows obligations when analyzing its funding and costs at a high level.

**Table A.1. RDECOM FY 2016 Obligations by Funding Source ($Millions)**

| Org. | Direct RDT&E | Direct OMA | Other Appropriations | Reimbursable Customer | Classified Projects | Totals |
|---|---|---|---|---|---|---|
| HQ Indirect | 8 | 30 | 0 | 5 | 0 | 43 |
| HQ Mission | 77 | 9 | 0 | 1 | 4 | 91 |
| ARL | 849 | 48 | 0 | 405 | 7 | 1,309 |
| AMRDEC | 372 | 42 | 17 | 790 | 18 | 1,238 |
| ARDEC | 206 | 50 | 21 | 967 | 0 | 1,243 |
| CERDEC | 416 | 62 | 0 | 295 | 16 | 788 |
| ECBC | 53 | 14 | 0 | 286 | 0 | 353 |
| NSRDEC | 129 | 56 | 1 | 108 | 0 | 293 |
| TARDEC | 285 | 17 | 0 | 179 | 2 | 483 |
| **Total** | **2,394** | **327** | **38** | **3,035** | **47** | **5,842** |

SOURCE: Analysis of RDECOM data provided on June 16, 2017.
NOTES: RDT&E = Research, Development, Test, and Evaluation; OMA = Operations and Maintenance, Army; HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

In addition to funds RDECOM receives directly, RDECOM uses direct cite funding to pay its contractors. Direct cite enables RDECOM's customers to utilize RDECOM's contracts to hire contractors. Funds go directly from the customer to the contractor, bypassing RDECOM. To

recover RDECOM's contracting costs, RDECOM charges the customer a contracting fee as a percentage of the contract.

Navy Working Capital Fund (NWCF) laboratory activities also engage extensively in direct cite. However, the Navy charges contracting efforts as a direct cost purchased from the NWCF, which it loads with indirect rates.

Direct charge is a similar concept used for Army-to-Army transactions within GFEBS. However, direct charge allows RDECOM's personnel to charge customer funds directly without transferring ownership of funding to RDECOM. RDECOM's use of direct charge is minimal since AMC is not required to utilize direct charge.

Table A.2 summarizes direct cite and direct charge funding in RDECOM. Practices vary widely by organization. The Aviation and Missile Research, Development, and Engineering Center (AMRDEC), for example, uses direct cite extensively. They explained that one of the drivers of direct cite is to use contractor personnel more heavily than other RDECOM organizations, since demand from customers is much greater than their ability to supply Army civilian personnel to do the work.

**Table A.2. RDECOM FY 2016 Direct Cite, Direct Charge, and Other Funds (i.e., Appropriations and Reimbursable Funds) ($Millions)**

| Org. | Direct Cite | Direct Charge | Other Funds |
|---|---|---|---|
| HQ Total | 0 | 0 | 134 |
| ARL | 586 | 81 | 1,309 |
| AMRDEC | 1,343 | 36 | 1,238 |
| ARDEC | 0 | 0 | 1,243 |
| CERDEC | 650 | 0 | 788 |
| ECBC | 5 | 0.1 | 353 |
| NSRDEC | 5.3 | 1.3 | 293 |
| TARDEC | 13 | 0.4 | 483 |
| **Total** | **2,602** | **119** | **5,842** |

SOURCE: RDECOM data provided on September 15, 2017, and analysis of RDECOM data provided on June 16, 2017.
NOTES: HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

## RDECOM Cost Data

RDECOM possesses a limited ability to provide high-level data providing details of their costs. Table A.3 provides a high-level breakdown of how much RDECOM collected and obligated for several types of activities. Indirect collections are indirect costs funded by taxing

projects (funded by reimbursable funds from customers and appropriations) with indirect rates. Section 219, which is discussed in greater detail in Appendix D, is another type of indirect cost that can be recovered as a percentage of funding received and used at the discretion of laboratory management. Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) as well as congressionally directed additions are funded through Army RDT&E funding but are not subject to indirect rate collections.

**Table A.3. RDECOM FY 2016 Obligations by Funding Source: Breakouts ($Millions)**

| Org. | Indirect Collections | Section 219 | SBIR/STTR | Congressional Adds |
|---|---|---|---|---|
| HQ Indirect | 0 | 0 | 0 | 0 |
| HQ Mission | 0 | 0 | 0 | 0 |
| ARL | 122 | 34 | 35 | 104 |
| AMRDEC | 82 | 2 | 32 | 92 |
| ARDEC | 162 | 15 | 14 | 63 |
| CERDEC | 74 | 0 | 25 | 40 |
| ECBC | 72 | 4 | 9 | 0 |
| NSRDEC | 28 | 3 | 10 | 20 |
| TARDEC | 59 | 10 | 20 | 34 |
| **Total** | **598** | **69** | **194** | **352** |

SOURCE: Analysis of RDECOM data provided on June 16, 2017.
NOTES: Indirect Collections and Section 219 are recovered from the direct and reimbursable funding sources in Table A.1. SBIR/STTR and congressional adds are included in "Direct RDTE" in Table A.1. HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

RDECOM provided the study team with additional FY 2017 data. Table A.4 shows how funds were obligated, based on the original funding source, after indirect recoveries had been removed. In Table A.4, each column represents net direct costs for each funding source after indirect recoveries have been removed, except for "Indirect/Sec. 219"; this column represents net indirect costs.

**Table A.4. RDECOM FY 2017 Obligations by Expenditure: Breakouts ($Millions)**

| Org | S&T | Other RDT&E | OMA | Other | Reimbursables | Indirect/ Sec. 219 | Total |
|---|---|---|---|---|---|---|---|
| HQ Total | 13.8 | 68.2 | 31.0 | 7.1 | 5.3 | 0.0 | 125.4 |
| ARL | 609.3 | 96.7 | 39.6 | 36.5 | 347.8 | 150.9 | 1,280.8 |
| AMRDEC | 328.7 | 84.7 | 43.8 | 4.9 | 740.2 | 87.7 | 1,290.0 |
| ARDEC | 149.1 | 34.4 | 32.4 | 33.2 | 1,124.8 | 184.5 | 1,558.5 |
| CERDEC | 367.3 | 68.9 | 82.4 | 6.2 | 276.8 | 82.6 | 884.3 |
| ECBC | 9.3 | 17.3 | 9.4 | 36.7 | 222.7 | 70.3 | 365.8 |
| NSRDEC | 81.1 | 21.3 | 8.7 | 72.0 | 109.7 | 34.2 | 326.9 |
| TARDEC | 221.0 | 75.6 | 11.0 | 3.8 | 154.5 | 77.7 | 543.5 |
| **Total** | **1,779.6** | **467.2** | **258.2** | **200.5** | **2,981.7** | **688.1** | **6,375.2** |

SOURCE: Analysis of RDECOM data provided on December 18, 2017.
NOTES: Science and technology (S&T) funding is for RDT&E 6.1, 6.2, and 6.3 funds. HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

Table A.5 shows each organization's cost share (based on data shown in Table A.4). Reimbursable cost share varies considerably across RDECOM. It is highest at ARDEC (72 percent) and ECBC (61 percent), the two organizations that spearheaded AMC and RDECOM's efforts to develop the AMC Reimbursable CONOPS. Table A.5 also summarizes additional data that RDECOM provided to the study team for civilian hours worked. The reimbursable share of these hours varies substantially from reimbursable funding share. AMRDEC's overall share of reimbursable funding is 57 percent—lower than the reimbursable share of labor hours (72 percent) due to AMRDEC's extensive use of direct cite, which reduces the amount of reimbursable funding they receive for noncivilian labor costs. ARDEC, on the other hand, does not use direct cite, thereby inflating its reimbursable funding.

**Table A.5. RDECOM FY 2017 Reimbursable Share of Costs (Obligations) and Hours (Thousands)**

| Org. | Reimbursable Share of Costs | Appropriated Hours | Reimbursable Hours | Indirect Hours | Reimbursable Share of Hours |
|---|---|---|---|---|---|
| HQ Total | 4% | 326 | 44 | 0 | 12% |
| ARL | 27% | 1,830 | 1,207 | 314 | 36% |
| AMRDEC | 57% | 926 | 3,753 | 517 | 72% |
| ARDEC | 72% | 1,178 | 3,619 | 1,144 | 61% |
| CERDEC | 31% | 1,205 | 1,864 | 363 | 54% |
| ECBC | 61% | 195 | 1,401 | 310 | 74% |
| NSRDEC | 34% | 482 | 449 | 284 | 37% |
| TARDEC | 28% | 911 | 1,403 | 449 | 51% |
| **Total** | **47%** | **7,054** | **13,740** | **3,380** | **57%** |

SOURCE: Analysis of RDECOM data provided on December 18, 2017.
NOTES: HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

In discussions with the study team, customers—and often stakeholders—raised indirect rates as a primary concern about current reimbursable processes. Compared with ATEC's test centers, whose customers usually do not fund indirect costs (see Table B.4), RDECOM's indirect costs raised high levels of concern from stakeholders and customers. As Table A.6 shows, nearly two-thirds of indirect costs are paid by customers. Reimbursable customers at RDECOM, on average, pay a disproportionately large share of indirect costs for three reasons. First, RDECOM's RDECs and Army Research Laboratories (ARL) receive little funding to pay for indirect costs (Table A.6 shows that they received $26.8 million in BA 6.6 funds). Second, a sizable share of appropriations is exempt from paying indirect rates. Exemptions include classified projects, SBIR funds, STTR funds, and congressional adds. Third, RDECOM collects indirect costs (other than Section 219) using a base of civilian labor hours, but reimbursable funding is more civilian labor intensive than appropriations.[1]

[1] The study team calculated that 25 percent of costs paid by appropriations are for civilian labor versus 46 percent of reimbursable costs. Assuming this labor intensity is the same across appropriations subject to indirect rates, the average indirect tax (excluding Section 219) was 45 percent of civilian costs for appropriations subject to indirect rates versus 33 percent of civilian costs for reimbursables.

**Table A.6. Funding Breakdown Across RDECOM's RDECs and ARL, FY 2016 ($Millions)**

| | Direct Appropriations (Exempt from Indirect Rates) | Direct Appropriations (Subject to Indirect Rates) | Reimbursement from Customers | Total |
|---|---|---|---|---|
| Direct | $540.2 (11%) | $1,842.3.0 (37%) | $2,604.7 (52%) | $5,040.8 |
| Indirect (ex. Sec. 219) | $26.8 (4%) | $207.0 (33%) | $391.2 (63%) | $625.1 |
| Sec. 219 | 0 | $36.1 (53%) | $32.6 (47%) | $68.7 |
| **Total** | **$567.0 (10%)** | **$2,085.4 (37%)** | **$3,028.4 (53%)** | **$5,707.7** |

SOURCE: RAND Arroyo Center analysis of RDECOM obligations; data provided on June 16, 2017.

Appendix D examines changes to RDECOM's indirect costs over time, exploring in detail how the burden of indirect costs changed at a directorate within TARDEC when TARDEC first began implementing the AMC Reimbursable CONOPS.

Throughout the study, the study team found RDECOM could not provide detailed data across RDECOM beyond the appropriation source. A lack of detailed data was particularly problematic with reimbursable funding. For example, RDECOM tracks individual projects within GFEBS by WBS code. RDECOM can show customers and stakeholders how they are spending their money on individual efforts. However, there is a lack of higher-level transparency in how that reimbursable funding is spent across RDECOM. RDECOM does not track WBS by activity (e.g., engineering matrixed support versus laboratory efforts). These activities are aggregated across all reimbursables in the tables above.[2] Therefore, it becomes difficult to understand how RDECOM spends its resources at a macro level.

Throughout discussions with RDECOM, customers, and other stakeholders, a delineation became clear between reimbursable funding used to fund engineering matrixed support and reimbursable funding used to fund other laboratory activities. RDECOM was unable to provide financial data from GFEBS or FIRE to show the relative magnitude of these activities. Therefore, RDECOM asked each organization, through a data call, to count the number of personnel (measured via full-time equivalents [FTEs] in cases where personnel were part time or only were matrixed part of the year), which is summarized in Table A.7. Matrixed personnel are about a quarter of RDECOM's reimbursable civilian workforce, but this percent varies considerably by organization. For example, nearly half the reimbursable workforce at AMRDEC is matrixed.

[2] ATEC's uses "statistical internal orders" to track attributes that are important to HQ ATEC; for example, specific efforts funded through indirect cost pools and test capabilities that are used. This practice allows ATEC to easily monitor execution of these labeled efforts and capabilities. Similarly, RDECOM could label reimbursable efforts to assist in producing detailed breakdown of finances across different categories of reimbursable activity.

**Table A.7. Full-Time Equivalent Breakout of RDECOM Embedded Matrixed Personnel, FY 2016**

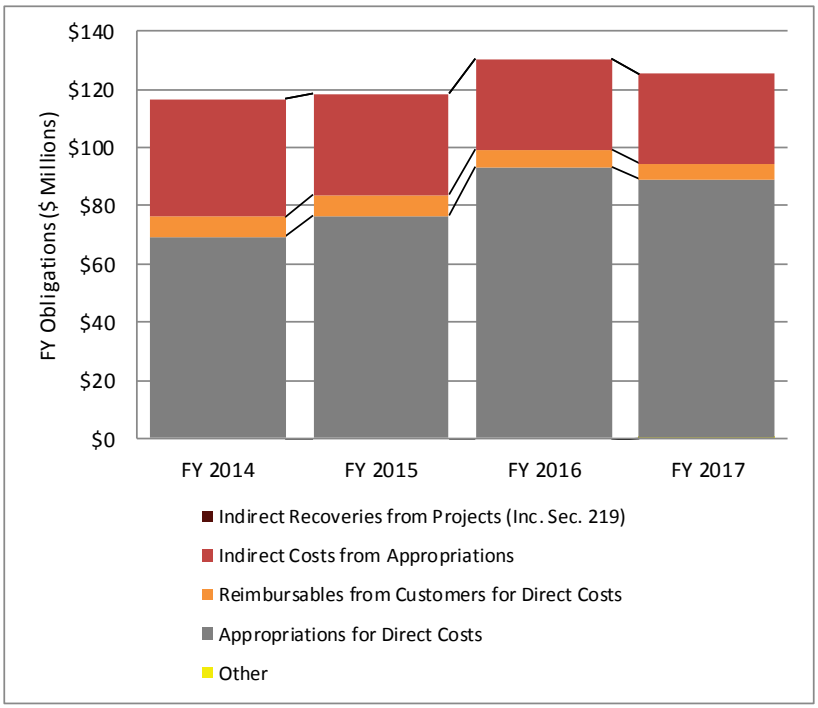
| Organization | Embedded with PEO/PM but Performing Core RDECOM Mission | Embedded with PEO/PM Performing PEO/PM Mission | Total Embedded Work Years | Total Reimbursable FTEs | Total FTEs |
|---|---|---|---|---|---|
| HQ Total | 0 | 0 | 0 | 30 | 231 |
| ARL | 0 | 0 | 0 | 712 | 1,914 |
| AMRDEC | 19 | 821 | 840 | 2,166 | 3,047 |
| ARDEC | 5 | 275 | 280 | 2,059 | 3,456 |
| CERDEC | 2 | 300 | 302 | 1,065 | 1,979 |
| ECBC | 0 | 180 | 180 | 812 | 1,085 |
| NSRDEC | 0 | 21 | 21 | 250 | 714 |
| TARDEC | 0 | 283 | 283 | 800 | 1,502 |
| **Total** | **26** | **1,880** | **1,906** | **7,893** | **13,928** |

SOURCE: RDECOM matrixed personnel data provided on June 16, 2017, and analysis of RDECOM data provided on December 18, 2017.
NOTES: RDECOM uses a standard 1,740 hours per FTE, which represents a typical number of hours worked by a full-time employee in a year. PEO/PM = program executive office/program manager; HQ = headquarters; ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

## RDECOM Cost Data over Time

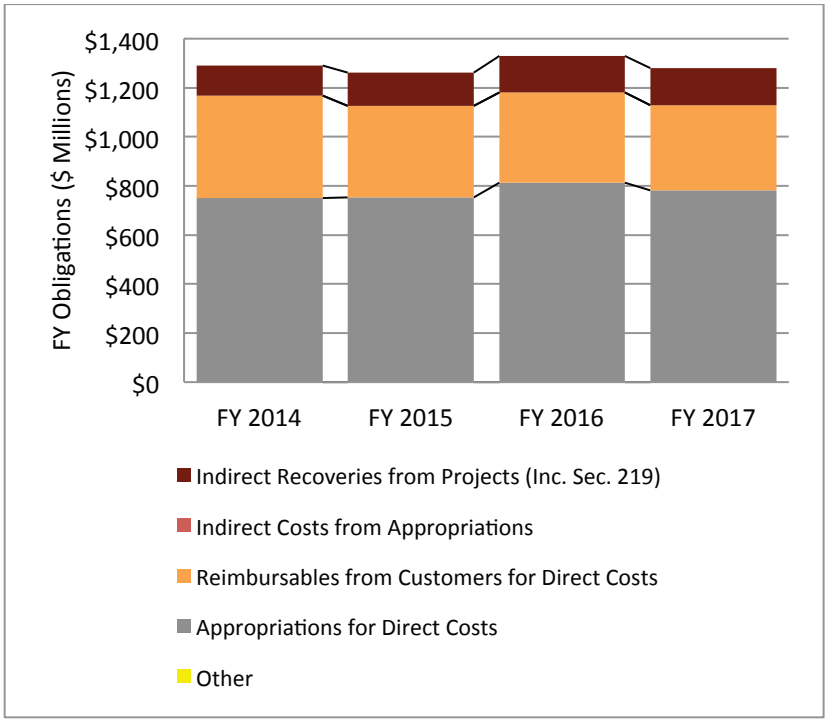
The study team asked RDECOM to provide data showing how costs changed over time. RDECOM was able to provide four years of data from GFEBS. These are shown for HQ RDECOM (Figure A.1), ARL (Figure A.2), and the RDECs (Figure A.3). Overall, high-level costs are relatively stable between years. In numerous conversations, RDECOM managers told the study team costs are relatively stable and predictable from one year to the next. Over time, costs do change as appropriated funds change and programs mature, but such changes are predictable and changes usually balance at a high level. A notable change within the figures is that indirect recoveries from projects (i.e., taxes on reimbursables and appropriations) grew during these years from about $120 million to $150 million at ARL and $400 million to $540 million at the RDECs. Appendix D explores indirect cost growth in greater detail.

**Figure A.1. HQ RDECOM Costs, FY 2014 to FY 2017**



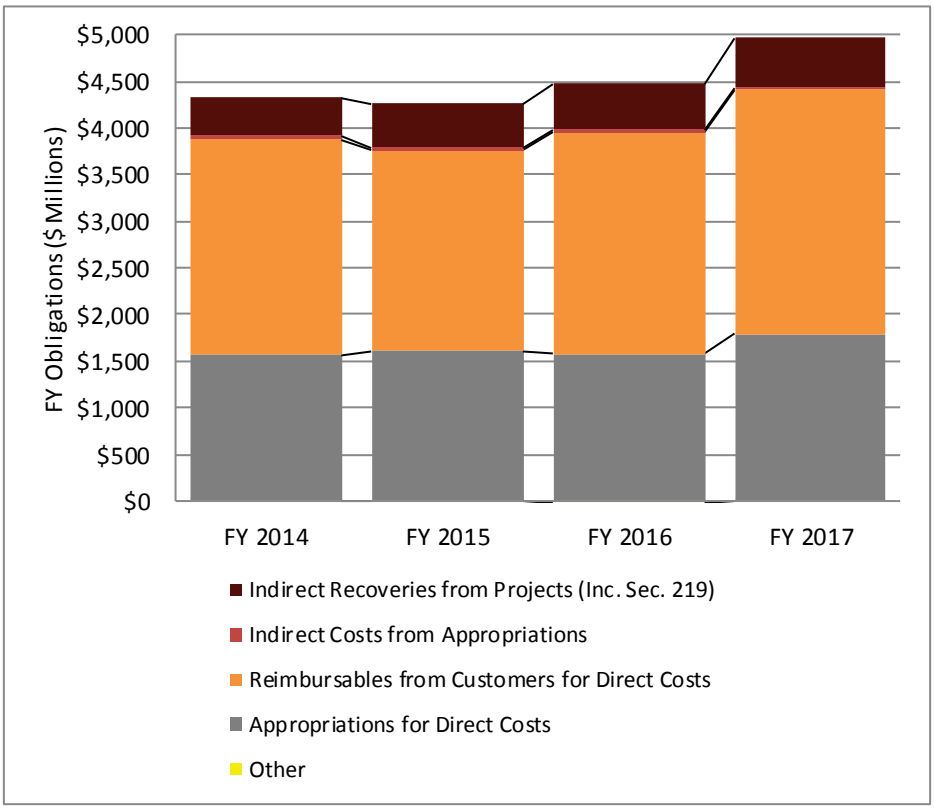

SOURCE: Analysis of RDECOM data provided on December 18, 2017.

**Figure A.2. ARL Costs, FY 2014 to FY 2017**




SOURCE: Analysis of RDECOM data provided on December 18, 2017.

**Figure A.3. Total RDEC Costs, FY 2014 to FY 2017**




SOURCE: Analysis of RDECOM data provided on December 18, 2017, and RDECOM query of Program Optimization and Budget Evaluation (PROBE) database for PE 0605801A, "Programwide Activities."

## Analysis of RDECOM Cost Practices

The study team worked closely with RDECOM to identify their cost practices and measure costs for FY 2016. Table A.8 shows RDECOM's cost policies. In all of the following tables, "direct costs" are costs charged directly to a project, which at RDECOM can be funded with appropriations or reimbursable funds from customers. "Indirect costs" are funded by indirect cost pools recovered by taxing projects with indirect rates. Recoveries are pooled within these indirect cost pools, so there is no way to trace specific indirect costs each project funded.

**Table A.8. RDECOM General Cost Practices**

| | Category | RDECOM HQ Activities | RDECOM Appropriations | RDECOM Reimbursable |
|---|---|---|---|---|
| | **Sec. 219 tax** | N/A | Optional; 2-4% taken off top of all mission funds | Optional; 2-4% taken off top of all mission funds |
| **Direct costs** | **Civilian labor** | DAC labor rates | DAC labor rates with indirect tax | DAC labor rates with indirect tax |
| | **Mission-specific training: Labor** | | | |
| | **Mission-specific training: Nonlabor** | Actual cost | Actual cost | Actual cost |
| | **CTR labor** | | | |
| | **Nonlabor** | | | |
| **Indirect costs** | **Civilian labor** | DAC labor rates | DAC labor rates | DAC labor rates |
| | **General training: Labor** | | | |
| | **General training: Nonlabor** | Actual cost | Actual cost | Actual cost |
| | **CTR labor** | Actual cost | Actual cost | Actual cost |
| | **Nonproductive time** | N/A | N/A[a] | |
| | **Nonlabor** | Actual cost | Actual cost | Actual cost |
| | **Internal bills/service cost centers** | N/A | Actual cost[b] | Actual cost[b] |

NOTES:
[a] RDECOM personnel do not have nonproductive time, but if they did, RDECOM would reduce the number of hours in the productive work year in the Department of the Army Civilian (DAC) labor rate calculation.
[b] RDECOM uses "internal bills"; WCF uses "service cost centers." These methods allocate indirect costs on a basis of something other than labor hours.
Red indicates RDECOM pays the cost with their appropriations. Blue indicates reimbursable customers pay.

Most costs charged to RDECOM's appropriations, reimbursable customers, and indirect cost pools are actual costs. The notable exception is civilian labor. Table A.8 denotes these as "DAC Labor Rates," which are computed in a similar manner across all Army organizations in GFEBS. Table A.9 provides details of these calculations. GFEBS charges projects and cost pools average labor costs per hour multiplied by the hours reported on the time cards. These average labor costs are determined by "faces-to-spaces" rates set by Army policies. They are averages since the cost is averaged across all employees within a pay band and a cost center.[3] These rates are multiplied by an adjustment to pay for the employee's leave, as the leave cannot be charged to projects or indirect cost pools. RDECOM adjusts the labor rates by a factor accounting for the "productive work year rate," which is the average number of hours employees charge in a year. The productive work year rate is initially a guess based on historic averages but can be adjusted throughout the year to minimize end of the year variance as the organizations develop a better idea about how many average hours will be worked (which can vary year to year due to weather

[3] If a cost center has only one employee of a certain labor type within a pay band, then costs will be actual pay and benefits.

closures and variance in sick and vacation leave). Finally, direct civilian labor is loaded with an indirect rate that funds the organizations' indirect cost pools. Contractor labor is charged at the actual cost of the contract.

**Table A.9. RDECOM Labor Rate Policies**

| | Category | RDECOM HQ Activities | RDECOM Appropriations | RDECOM Reimbursable |
|---|---|---|---|---|
| Civilian labor rates | Salaries | Average actual salaries across cost center/activity type/band | | |
| | Benefits | Average actual benefits across cost center/activity type/band | | |
| | Leave | Labor rates adjustment: $\frac{2087}{\text{Productive work year rate}}$ | | |
| | Indirect assessment | Tier 1/2/3 tax on mission-funded activities only | | |
| CTR labor rates | Contract cost allocation | Direct: Actual contract cost[a] charged to each order<br>Indirect: Actual contract cost[a] charged to overhead pools | | |
| | Indirect assessment | N/A | | |

[a] Actual contract cost includes contractor salaries, benefits, leave, G&A, fee, and so on.

Table A.10 shows RDECOM policies for funding other types of costs that were of interest to customers and stakeholders. RDECOM does not charge for labor from military personnel; however, RDECOM had only 159 military personnel in FY 2016 versus 13,825 civilian personnel and 10,260 on-site contractors. Further, RDECOM receives many services provided by third-party organizations (e.g., Defense Acquisition University [DAU], Army Contracting Command [ACC], Life Cycle Management Commands [LCMCs]—for example, Tank-automotive and Armaments Command (TACOM) hosts TARDEC at Detroit Arsenal).

**Table A.10. Other RDECOM Cost Policies**

| | Category | RDECOM HQ Activities | RDECOM Appropriations | RDECOM Reimbursable |
|---|---|---|---|---|
| Sec. 219 | Civilian labor costs | N/A | DAC labor rates | |
| | Other investment costs | | Actual cost | |
| Indirect costs at least partially paid by another org. | Developmental assignments | DAC labor rates[a] | DAC labor rates[a] | |
| | DAU acquisition training | DAU funded | | |
| | IMCOM/base support | IMCOM common level of support (overhead supplements) | IMCOM common level of support (overhead supplements) | |
| | MIL personnel | Military pay[b] | | |
| | ACC (contracting) | Core support (supplemented by overhead) | | |
| | LCMC (e.g., TACOM) | N/A | LCMC mostly pays (overhead supplements) | |
| Other | Net operating result | N/A[c] | | |
| | HQ costs | N/A | | |

NOTES:
[a] For external assignments, gaining organizations can also pay for part or all of the assignee's labor costs.
[b] The FMR requires non-DoD reimbursement of military pay (see FMR, vol. 11a [010203B2]; FMR, vol. 15 [070203]), but the commands told us that GFEBS lacks capability.
[c] Goal is revenue = costs. Rates and indirect budgets managed to minimize variance.
Red indicates RDECOM pays the cost with their appropriations. Blue indicates reimbursable customers pay. Orange indicates the Army or other Army organizations pay.
DAC = Department of the Army Civilian; DAU = Defense Acquisition University; IMCOM = Installation Management Command; LCMC = Life Cycle Management Center; MIL = military; ACC = Army Contracting Command; TACOM = Tank-automotive and Armaments Command; HQ = headquarters.

The remaining tables in this appendix fill in the above tables using data provided by RDECOM. Note that RDECOM lacks the ability to differentiate all costs. No Army command has high visibility into what costs other commands are paying (denoted in orange). RDECOM cannot differentiate between time that civilian personnel spend on training that are paid by customers or appropriations, and RDECOM cannot differentiate between contract costs paid for on-site contractor labor versus off-site contractor labor versus other nonlabor costs. FIRE indirect budgets provided some additional granularity and were used by RDECOM to estimate indirect cost breakdowns (e.g., indirect costs in the following tables' breakout contractor labor versus nonlabor), but they are estimates that cannot be validated with execution data from GFEBS.

**Table A.11a. RDECOM Cost Breakdown by Funding Source, FY 2016: Summary ($Millions)**

| | Category | RDECOM HQ Activities | ARL and RDEC Totals | | Total Approp | Total Reimb | Total |
|---|---|---|---|---|---|---|---|
| | | | Approp | Reimb | | | |
| | Sec. 219 tax | N/A | $36.1M | $32.6M | $36.1M | $32.6M | **$68.7M** |
| Direct costs | Civilian labor | $0.0M | $606.5M | $1,191.5M | $606.5M | $1,191.5M | **$1,798.0M** |
| | Mission-specific training: Labor | | | | | | |
| | Mission-specific training: Nonlabor | $0.0M | $2.3M | $5.2M | $2.3M | $5.2M | **$7.5M** |
| | CTR labor | $89.7M, $1.4M | $1,827.3M | $1,407.9M | $1,917.0M | $1,409.3M | **$3,326.3M** |
| | Nonlabor | | | | | | |
| | Indirect assessment | | $207.0M | $391.2M | $207.0M | $391.2M | **$598.2M** |
| Indirect costs | Civilian labor | $35.6M, $5.6M | $293.1M | | $293.1M | | **$293.1M** |
| | General training: Labor | | | | | | |
| | General training: Nonlabor | $0.1M | $10.7M | | $10.7M | | **$10.7M** |
| | CTR labor | $0.0M | $153.7M | | $153.7M | | **$153.7M** |
| | Nonproductive time | N/A | N/A | | N/A | | **N/A** |
| | Nonlabor | $2.1M | $90.5M | | $90.5M | | **$90.5M** |
| | Internal bills/service cost centers | $0.0M | $35.1M | | $35.1M | | **$35.1M** |
| Totals | Total mission costs | $89.7M, $1.4M | $2,436.1M | $2,604.7M | $2,525.8M | $2,606.1M | **$5,131.9M** |
| | Indirect assessment | N/A | $207.0M | $391.2M | $207.0M | $391.2M | **$598.2M** |
| | Total indirect costs | $37.8M, $5.1M | $583.0M | | $641.1M | | **$641.1M** |
| | Split of indirect costs | 88%, 12% | 36% | 67% | 38% | 62% | |

SOURCE: RAND Arroyo Center analysis of RDECOM obligations data provided on June 16, 2017; FIRE overhead budget data provided by RDECOM on July 17, 2017; supplemented with RDECOM obligations data provided on August 4, 2017, to fill in matrix gaps.
NOTE: Red indicates RDECOM pays the cost with their appropriations. Blue indicates reimbursable customers pay. Black indicates a total or indirect cost pool combining appropriations and customers' funds.

**Table A.11b. RDECOM Cost Breakdown by Funding Source, FY 2016: HQ, ARL, AMRDEC, and ARDEC ($Millions)**

| | | HQ | | ARL | | AMRDEC | | ARDEC | |
|---|---|---|---|---|---|---|---|---|---|
| | Category | Approp | Reimb | Approp | Reimb | Approp | Reimb | Approp | Reimb |
| | Sec. 219 tax | N/A | N/A | $23.5 | $10.5 | $2.3 | $0.0 | $2.8 | $12.2 |
| Direct costs | Civilian labor | $0.0 | $0.0 | $159.5 | $79.7 | $92.1 | $341.5 | $101.4 | $306.8 |
| | Mission-specific training: Labor | | | | | | | | |
| | Mission-specific training: Nonlabor | $0.0 | $0.0 | $1.1 | $0.6 | $0.2 | $0.4 | $0.2 | $2.5 |
| | CTR labor | $89.7 | $1.4 | $638.8 | $273.9 | $337.6 | $382.3 | $136.5 | $518.9 |
| | Nonlabor | | | | | | | | |
| | Indirect assessment | N/A | N/A | $81.4 | $40.1 | $16.3 | $65.4 | $35.6 | $126.2 |
| Indirect costs | Civilian labor | $35.6 | $5.1 | $55.9 | | $47.4 | | $81.1 | |
| | General training: Labor | | | | | | | | |
| | General training: Nonlabor | $0.1 | $0.0 | $0.2 | | $0.8 | | $3.6 | |
| | CTR labor | $0.0 | $0.0 | $48.1 | | $26.1 | | $35.2 | |
| | Nonproductive time | N/A | N/A | N/A | | N/A | | N/A | |
| | Nonlabor | $2.1 | $0.0 | $15.3 | | $6.5 | | $26.7 | |
| | Internal bills/service cost centers | | | $0.0 | | $0.0 | | $12.8 | |
| Totals | Total mission costs | $89.7 | $1.4 | $799.4 | $354.1 | $430.0 | $724.2 | $238.0 | $828.2 |
| | Indirect assessment | N/A | N/A | $81.4 | $40.1 | $16.3 | $65.4 | $35.6 | $126.2 |
| | Total indirect costs | $37.8 | $5.1 | $119.5 | | $80.8 | | $159.4 | |
| | Split of indirect costs | 88% | 12% | 68% | 34% | 20% | 81% | 22% | 79% |

SOURCE: RAND Arroyo Center analysis of RDECOM obligations data provided on June 16, 2017; FIRE overhead budget data provided by RDECOM on July 17, 2017; supplemented with RDECOM obligations data provided on August 4, 2017 to fill in matrix gaps.
NOTE: Red indicates RDECOM pays the cost with their appropriations. Blue indicates reimbursable customers pay. Black indicates a total or indirect cost pool combining appropriations and customers' funds.

**Table A.11c. RDECOM Cost Breakdown by Funding Source, FY 2016: CERDEC, ECBC, NSRDEC, and TARDEC ($Millions)**

| | | CERDEC | | ECBC | | NSRDEC | | TARDEC | |
|---|---|---|---|---|---|---|---|---|---|
| | Category | Approp | Reimb | Approp | Reimb | Approp | Reimb | Approp | Reimb |
| | Sec. 219 tax | $0.0 | $0.0 | $0.2 | $4.2 | $1.4 | $1.3 | $6.0 | $4.4 |
| Direct costs | Civilian labor | $130.6 | $172.7 | $17.7 | $140.6 | $33.9 | $38.1 | $71.3 | $112.1 |
| | Mission-specific training: Labor | | | | | | | | |
| | Mission-specific training: Nonlabor | $0.3 | $0.2 | $0.1 | $0.2 | $0.0 | $0.0 | $0.5 | $1.3 |
| | CTR labor | $332.9 | $77.0 | $42.7 | $75.2 | $135.0 | $55.8 | $203.7 | $24.9 |
| | Nonlabor | | | | | | | | |
| | Indirect assessment | $29.4 | $44.7 | $5.9 | $66.3 | $15.1 | $12.7 | $23.3 | $35.9 |
| Indirect costs | Civilian labor | $38.8 | | $20.6 | | $19.8 | | $29.5 | |
| | General training: Labor | | | | | | | | |
| | General training: Nonlabor | $2.1 | | $0.9 | | $0.3 | | $2.6 | |
| | CTR labor | $19.6 | | $11.3 | | $8.8 | | $4.7 | |
| | Nonproductive time | N/A | | N/A | | N/A | | N/A | |
| | Nonlabor | $14.5 | | $14.9 | | $3.4 | | $9.2 | |
| | Internal bills/service cost centers | $1.3 | | $14.3 | | $0.3 | | $6.4 | |
| Totals | Total mission costs | $463.8 | $249.9 | $60.5 | $216.0 | $168.9 | $94.0 | $275.5 | $138.3 |
| | Indirect assessment | $29.4 | $44.7 | $5.9 | $66.3 | $15.1 | $12.7 | $23.3 | $35.9 |
| | Total indirect costs | $76.3 | | $62.0 | | $32.6 | | $52.5 | |
| | Split of indirect costs | 39% | 59% | 10% | 107% | 46% | 39% | 44% | 68% |

SOURCE: RAND Arroyo Center analysis of RDECOM obligations data provided on June 16, 2017; FIRE overhead budget data provided by RDECOM on July 17, 2017; supplemented with RDECOM obligations data provided on August 4, 2017, to fill in matrix gaps.
NOTE: Red indicates RDECOM pays the cost with their appropriations. Blue indicates reimbursable customers pay. Black indicates a total or indirect cost pool combining appropriations and customers' funds.

**Table A.12. RDECOM Average Labor Rates Components**

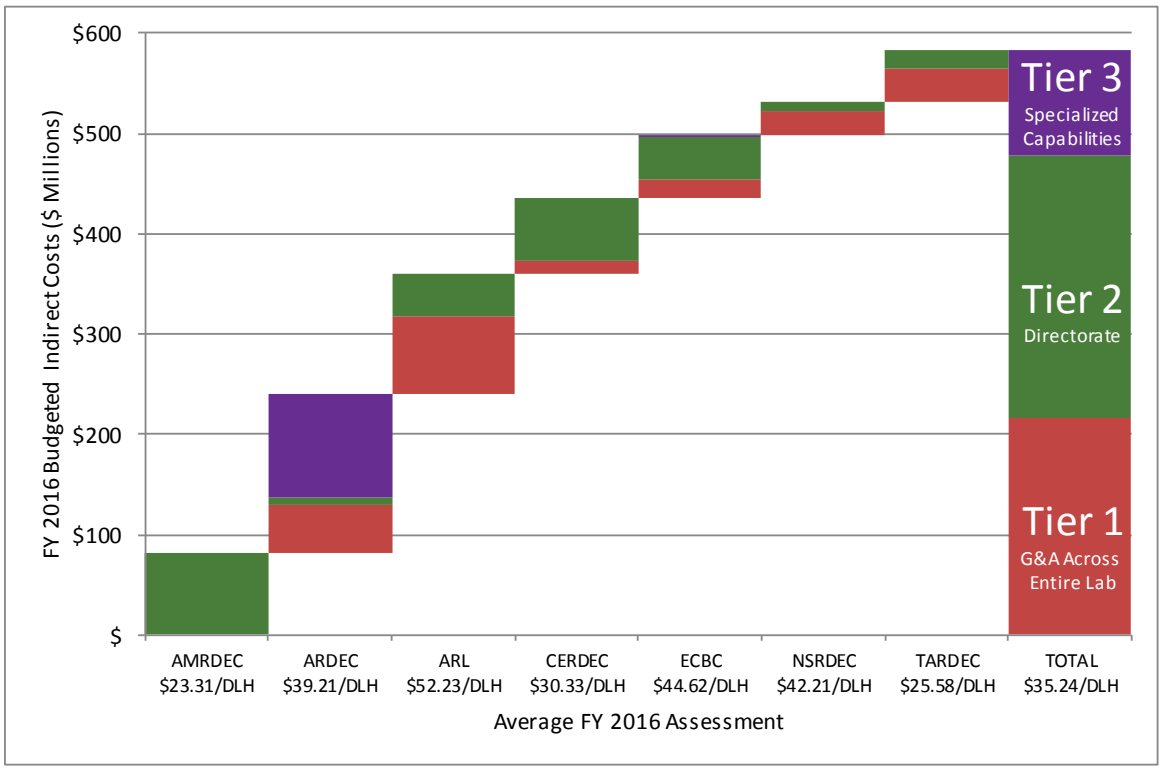
| | Category | RDECOM HQ Activities | RDECOM Appropriations | RDECOM Reimbursable |
|---|---|---|---|---|
| Civilian labor rates | Salaries | Average salary: $53.23/hour | | |
| | Benefits | Average benefits: $16.05/hour | | |
| | Leave | Labor rates adjustment: $15.08/hour | | |
| | Indirect assessment | FY 2016 average = $35.24/hour | | |
| CTR labor rates | Contract cost allocation | Actual contract cost | | |
| | Indirect assessment | N/A | | |

SOURCE: RAND Arroyo Center analysis of salary data provided by RDECOM on September 15, 2017.

*Indirect Cost Structure at RDECOM*

Figure A.4 compares budgeted indirect cost pool tiers for FY 2016. During FY 2016, cost accounting practices were transitioning to conform to AMC's CONOPS. For example, AMRDEC only had Tier 2 cost pools,[4] and TARDEC had not yet implemented any Tier 3 cost pools (the TARDEC examples in Appendix D are based on budgets for FY 2017 when one directorate began implementing Tier 3 cost pools). Nevertheless, even when organizations conform to the CONOPS, there are substantial differences in the relative use of the tiers. For example, although Tier 3 is optional and rarely used, a majority of ARDEC's indirect costs were in Tier 3.

**Figure A.4. Comparison of Indirect Cost Pool Tiers in RDECOM, FY 2016**




SOURCE: RAND Arroyo Center analysis of RDECOM data supplied July 17, 2017. Data are from RDECOM's FY 2016 budgets created prior to the fiscal year.
NOTES: AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; ARL = Army Research Laboratories; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

[4] In FY 2016, AMRDEC only tracked Tier 2, directorate-level cost pools in FIRE. AMRDEC did not track a Tier 1 cost pool common to the entire RDEC like all the other organizations within FIRE. AMRDEC did track the functions that would become Tier 1 in FIRE (e.g., "Facilities" and "Front Office") outside of FIRE, which they used to conduct year-to-year overhead comparisons.

# Appendix B. ATEC Funding Overview

This appendix summarizes data from GFEBS that ATEC provided to RAND Arroyo Center at the beginning of this study. The data provide a baseline of how ATEC funds its activities. ATEC's organizations are listed in Table 2.2, all of which are included in the analysis of this appendix. AEC and OTC use a different funding model relying on reimbursables mainly for noncivilian labor direct costs, so the study team, in consultation with the sponsor, stakeholders, and ATEC, excluded these organizations from the in-depth analysis of alternative funding models, focusing instead on the test ranges.

RAND Arroyo Center's analysis of ATEC's data is based on queries of ATEC's GFEBS data. ATEC provided instructions on the meaning of the fields and provided validation of the study team's calculations. Table B.1 breaks out direct costs[1] by funding type for all ATEC organizations in FY 2016. Customers pay nearly all direct costs at ATEC's test ranges, usually through reimbursable funds and also with direct charge and direct cite. Only around half of direct costs at AEC and OTC are funded by customers. In these organizations, customers only fund noncivilian labor direct costs—the direct costs of civilian labor are funded by appropriations. In these organizations, civilian personnel and contractor personnel perform different duties (e.g., at AEC the civilians are evaluators while contractors are statisticians), so there is relatively little ability to substitute between civilians and contractors.

[1] ATEC refers to direct costs as "mission" costs and tracks a field called "Attribute 1" in GFEBS to label whether costs are mission costs. ATEC refers to most indirect costs as "overhead" costs and uses the "Attribute 1" field in GFEBS to track different types of overhead spending. Some costs do not have a valid entry in the "Attribute 1" field and have been included as "other" throughout this report—for example, in Table B.3.

**Table B.1. ATEC Expenses for Direct Costs, FY 2016 ($Millions)**

| Organization | Appropriations | Reimbursable | Direct Charge | Direct Cite | Cost Transfer | Total | % from Customers |
|---|---|---|---|---|---|---|---|
| HQ ATEC | 0.3 | 0.0 | 1.8 | 0.0 | 0.0 | 2.1 | 85% |
| AEC | 35.1 | 23.9 | 1.3 | 0.5 | 0.0 | 60.9 | 42% |
| OTC | 14.2 | 15.0 | 5.5 | 0.0 | 0.0 | 34.7 | 59% |
| ATC | 1.5 | 102.3 | 2.3 | 0.3 | 1.1 | 107.4 | 98% |
| EPG | 0.4 | 26.6 | 0.7 | 0.0 | 0.0 | 27.8 | 98% |
| RTC | 5.0 | 104.2 | 2.0 | 0.0 | 3.8 | 115.1 | 92% |
| WDTC | 0.1 | 25.1 | 0.7 | 0.2 | 0.0 | 26.1 | 100% |
| WSTC | –0.1 | 96.7 | 6.0 | 3.8 | 0.1 | 106.5 | 100% |
| YTC | 0.4 | 94.8 | 1.6 | 0.0 | 1.1 | 97.8 | 99% |
| **Total** | **56.8** | **488.7** | **21.9** | **4.9** | **6.1** | **578.4** | **89%** |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: ATEC provided the study team with commitment, obligation, expense, and disbursement data. ATEC tracks its costs using expenses; thus the analysis in this report uses expenses for ATEC. In contrast, RDECOM prefers to track obligations. In the long-run, the two measures will converge. However, in the short run they can diverge. For example, obligations to contractors can potentially be expensed up to several years after the obligation. HQ = headquarters; AEC = Army Evaluation Command; OTC = Operational Test Command; ATC = Aberdeen Test Center; EPG = Electronic Proving Ground; RTC = Redstone Test Center; WDTC = West Desert Test Center; WSTC = White Sands Test Center; YTC = Yuma Test Center.

Table B.2 shows funding methods for ATEC's indirect costs in FY 2016. Indirect costs at HQ ATEC, AEC, and OTC are nearly all paid through ATEC's appropriations. Due to MRTFB regulations, only non-DoD customers can be charged for indirect costs, so the share of indirect costs at most test centers is in the single digits. RTC is not an MRTFB; therefore it can pay for most of its indirect costs through indirect recoveries from customers (like RDECOM). As discussed earlier in this report, YTC has counter-IED test capabilities that are not designated as MRTFB; thus they have a limited ability to recover indirect costs from DoD customers.

**Table B.2. ATEC Expenses for Indirect Costs, FY 2016 ($Millions)**

| Organization | Appropriations | Reimbursable | Direct Charge | Cost Transfer | Total | % from Customers |
|---|---|---|---|---|---|---|
| HQ ATEC | 57.7 | 0.1 | 0.0 | 0.0 | 57.8 | 0% |
| AEC | 18.2 | 0.2 | 0.0 | 0.0 | 18.4 | 1% |
| OTC | 41.0 | 0.5 | 0.0 | 0.1 | 41.5 | 1% |
| ATC | 102.3 | 7.5 | –0.1 | 0.0 | 109.6 | 7% |
| EPG | 37.3 | 1.6 | 0.0 | 0.0 | 38.9 | 4% |
| RTC | 21.3 | 53.3 | 0.4 | 0.0 | 75.0 | 72% |
| WDTC | 66.3 | 0.8 | 0.0 | 0.0 | 67.1 | 1% |
| WSTC | 111.3 | 14.1 | 0.0 | 0.0 | 125.4 | 11% |
| YTC | 85.5 | 11.2 | 0.2 | 0.1 | 97.0 | 12% |
| **Total** | **540.8** | **89.2** | **0.5** | **0.2** | **630.8** | **14%** |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: HQ = headquarters; AEC = Army Evaluation Command; OTC = Operational Test Command; ATC = Aberdeen Test Center; EPG = Electronic Proving Ground; RTC = Redstone Test Center; WDTC = West Desert Test Center; WSTC = White Sands Test Center; YTC = Yuma Test Center.

Table B.3 shows the overall breakdown of expenses in FY 2016. Most ATEC organizations record a high share of indirect expenses. Test ranges especially are capital intensive and require a great deal of investment and sustainment to maintain a healthy set of test capabilities.[2] AEC has the lowest indirect share overall, likely because AEC is a human-capital-heavy organization leveraging other organizations' physical capital. RTC has the second lowest indirect share, likely because RTC has a greater ability to divest of lightly utilized capabilities and because RTC has to charge its customers for indirect costs and therefore has incentives to keep those costs low.

[2] The data presented show ATEC's expenses. Other organizations such as DoD—through the Central Test and Evaluation Investment Program (CTEIP); Project Manager Instrumentation, Targets, and Threat Simulators (PM ITTS); and customers—also make investments into ATEC's capabilities without funding passing through ATEC.

**Table B.3. ATEC Expense Breakdown, FY 2016 ($Millions)**

| Organization | Direct | Indirect | Other | Total | Indirect % |
|---|---|---|---|---|---|
| HQ ATEC | 2.1 | 57.8 | 0.8 | 60.7 | 95% |
| AEC | 60.9 | 18.4 | 0.3 | 79.5 | 23% |
| OTC | 34.7 | 41.5 | 0.1 | 76.4 | 54% |
| ATC | 107.4 | 109.6 | 2.6 | 219.7 | 50% |
| EPG | 27.8 | 38.9 | 0.4 | 67.1 | 58% |
| RTC | 115.1 | 75.0 | 3.7 | 193.8 | 39% |
| WDTC | 26.1 | 67.1 | 0.1 | 93.3 | 72% |
| WSTC | 106.5 | 125.4 | 1.1 | 233.0 | 54% |
| YTC | 97.8 | 97.0 | 0.2 | 195.0 | 50% |
| **Total** | **578.4** | **630.8** | **9.2** | **1,218.4** | **52%** |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: HQ = headquarters; AEC = Army Evaluation Command; OTC = Operational Test Command; ATC = Aberdeen Test Center; EPG = Electronic Proving Ground; RTC = Redstone Test Center; WDTC = West Desert Test Center; WSTC = White Sands Test Center; YTC = Yuma Test Center.

Table B.4 summarizes funding across ATEC's test centers only—the focus of this study's analysis of alternative funding models. Compared with RDECOM's indirect funding (see Table A.6), indirect costs are slightly larger at ATEC even though ATEC is much smaller overall. However, most of the indirect costs (83 percent) are funded through appropriations. HQDA stakeholders like DUSA-T&E have good, high-level visibility into these costs while customers pay very little in indirect costs.

**Table B.4. Funding Breakdown Across ATEC Test Centers, FY 2016 ($Millions)**

| | Appropriations | Reimbursement from Customers | Total |
|---|---|---|---|
| Direct | 7.2 (2%) | 467.5 (98%) | 474.7 |
| Indirect | 424.0 (83%) | 88.9 (17%) | 630.2 |
| **Total** | **431.2 (44%)** | **556.4 (56%)** | **987.6** |

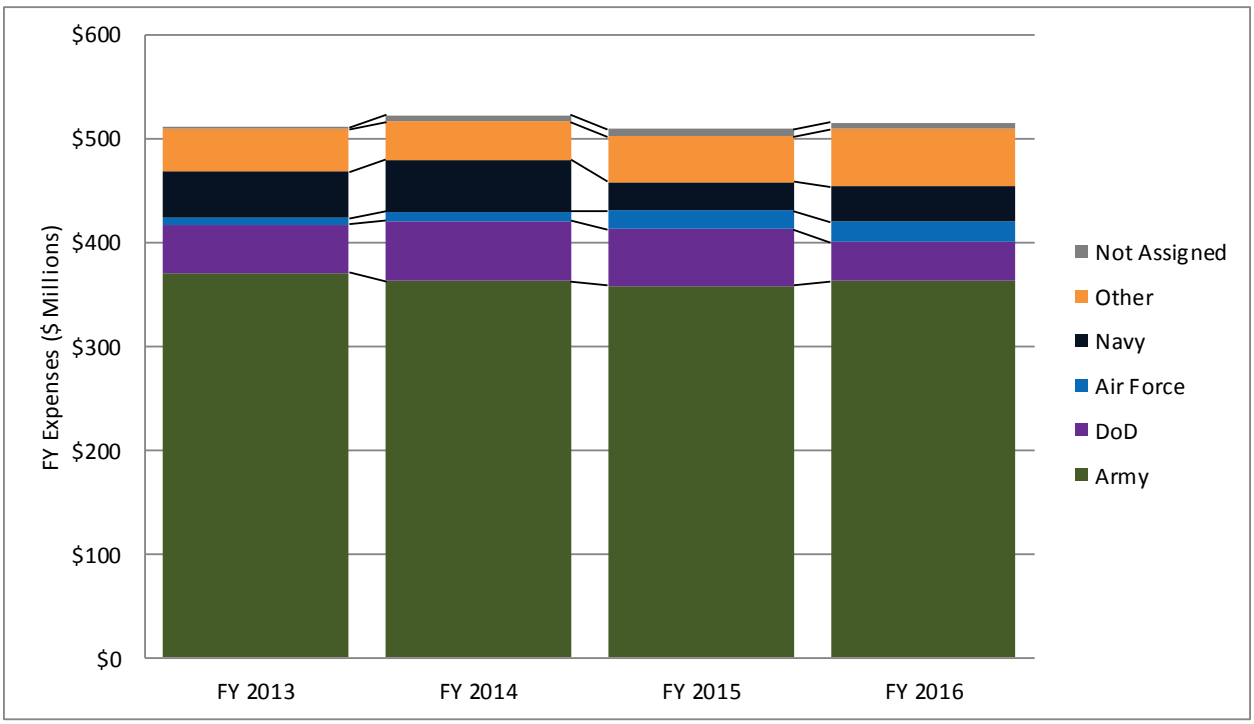
SOURCE: RAND Arroyo Center analysis of ATEC GFEBS expense data for FY 2016.
NOTE: Reimbursement from customers includes direct charge.

## ATEC Cost Data over Time

ATEC provided the study team with data for FY 2013 to FY 2016, which were the years for which full data were available from GFEBS. Figure B.1 shows the breakdown of reimbursable direct costs by customer for these years. Total year-to-year costs are relatively steady, but some military departments have relatively high year-to-year variance. For example, in FY 2015 funding from the Navy dropped by over 40 percent while funding from the Air Force nearly

doubled. During these years, funding from the Army stayed remarkably constant, with a low of $358 million in FY 2015 and a high of $370 million in FY 2013. Discussions with ATEC indicated funding from individual customers varies significantly and can be determined only in the year of execution since test requirements are often not known in advance. However, ATEC indicated that at an aggregate level overall demand is relatively predictable.

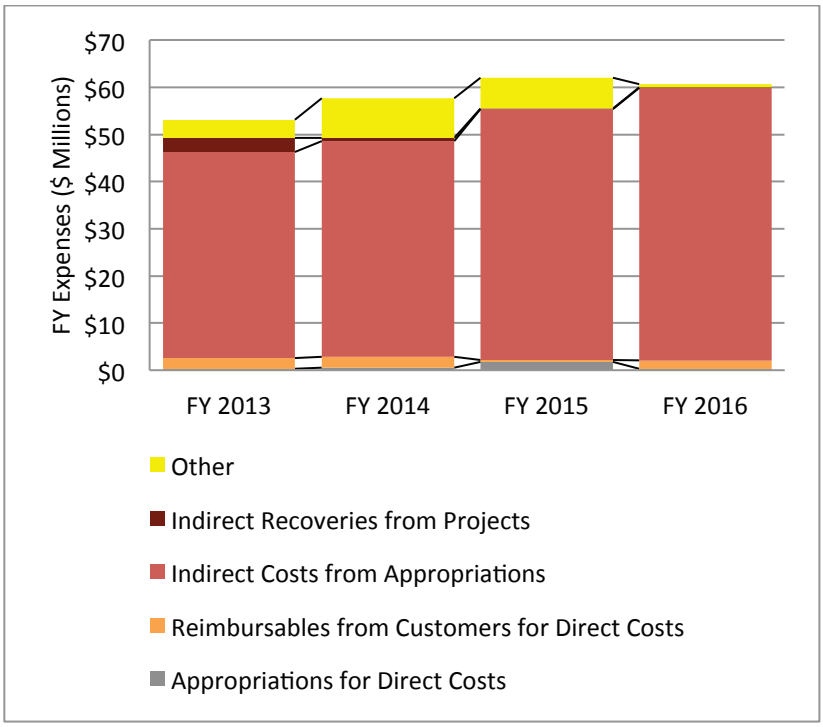
**Figure B.1. Test Center Direct, Reimbursable Expenses by Customer, FY 2013 to FY 2016**




SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

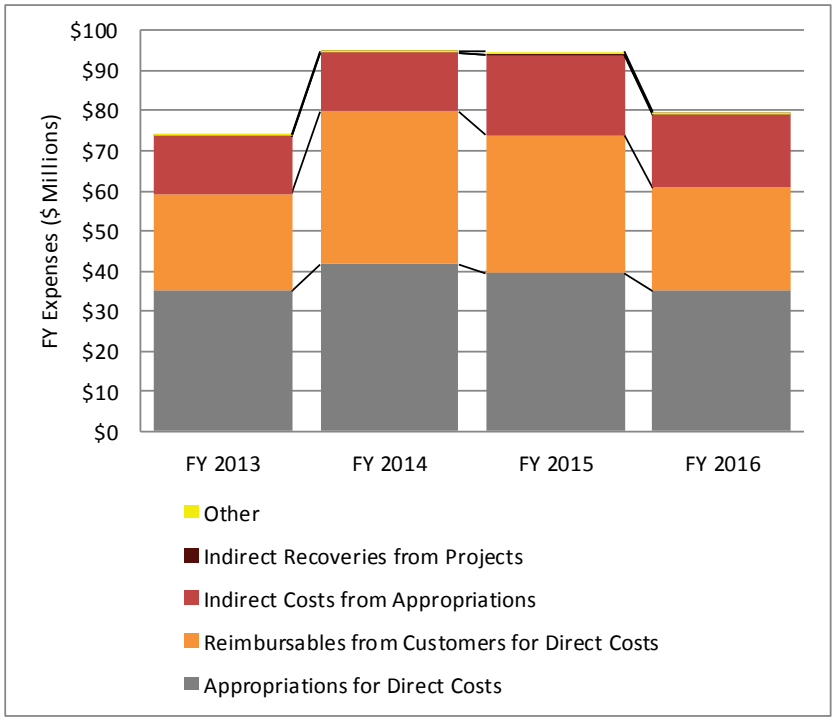
Figures B.2 to B.6 show breakdowns of funding for ATEC organizations. Overall, ATEC's non-test-center organizations (HQ ATEC, AEC, and OTC) show the greatest variability despite relying the least on customer reimbursable funding.

**Figure B.2. HQ ATEC Expenses, FY 2013 to 2016**



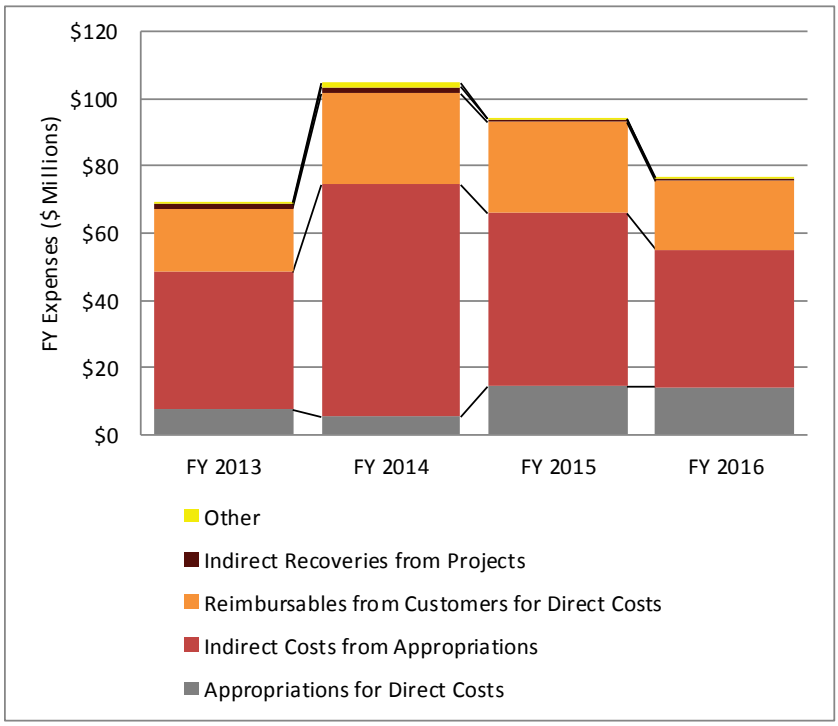

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

**Figure B.3. AEC Expenses, FY 2013 to 2016**



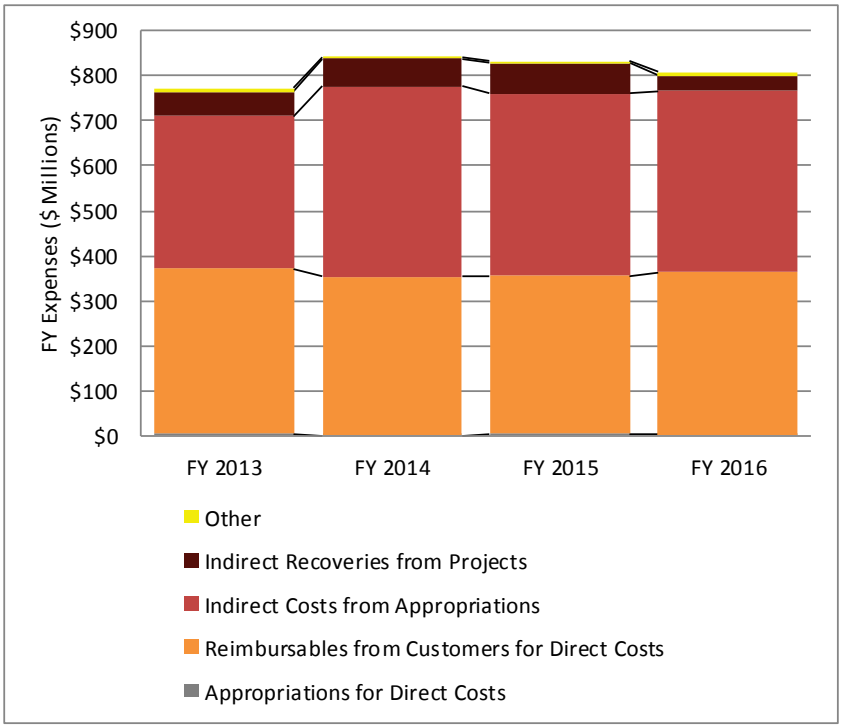

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

**Figure B.4. OTC Expenses, FY 2013 to 2016**



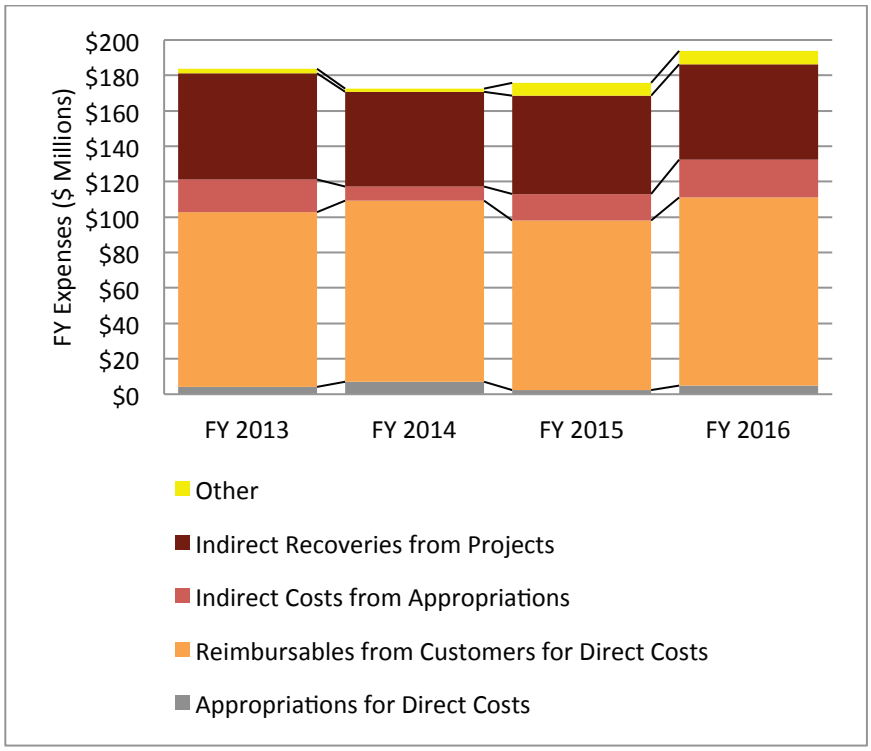

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

**Figure B.5. MRTFB Expenses, FY 2013 to 2016**




SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

**Figure B.6. RTC Expenses, FY 2013 to 2016**




SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.

## Analysis of ATEC Cost Practices

As with RDECOM, the study team worked with ATEC to understand their cost practices and measure costs for FY 2016. Table B.5 shows ATEC's cost policies, which have more variants than RDECOM's policies. Like RDECOM, ATEC funds its HQ using appropriations.[3] Per FY 2003 NDAA policies, ATEC's MRTFBs only charge DoD customers for direct costs while ATEC pays for indirect costs from its appropriations. ATEC's MRTFBs charge non-DoD customers and all customers of non-MRTFB capabilities for both direct costs and an indirect tax on labor hours that funds indirect costs.[4] As discussed earlier, both AEC and OTC largely pay for costs using their appropriations, although they use customer funds to pay for noncivilian labor direct costs. Finally, RTC operates similarly to RDECOM's model, except ATEC provides it with some appropriations to pay for indirect costs.

[3] As shown in Table B.9, HQ ATEC has nearly $2 million in direct costs it charges to customers. Most of these costs are direct charge costs to customers in DoD and the National Guard who are purchasing the services of ATEC's contractors.

[4] Note, however, these indirect rates charged for non-MRTFB capabilities only fund indirect costs tied specifically to the non-MRTFB capability and do not contribute to general and administrative indirect costs.

**Table B.5. ATEC General Cost Practices**

| | Category | ATEC HQ | MRTFB for DoD Customer | MRTFB for Non-DoD Customer or Outside MRTFB | AEC/OTC | RTC |
|---|---|---|---|---|---|---|
| | Sec. 219 tax | N/A | | | | |
| Direct costs | Civilian labor | DAC labor rates | DAC labor rates | DAC labor rates with indirect tax | DAC labor rates | DAC labor rates with indirect tax |
| | Mission-specific training: Labor | | | | | |
| | Mission-specific training: Nonlabor | Actual cost | Actual cost | Actual cost | Actual cost | Actual cost |
| | CTR labor | | | Actual cost with indirect tax | | Actual cost with indirect tax |
| | Nonlabor | | | Actual cost | | Actual cost |
| Indirect costs | Civilian labor | DAC labor rates | | DAC labor rates | DAC labor rates | DAC labor Rates[a] |
| | General training: Labor | | | | | |
| | General training: Nonlabor | Actual cost | | Actual cost | Actual cost | Actual cost |
| | CTR labor | Actual cost | | Actual cost | Actual cost | Actual cost[b] |
| | Nonproductive time | DAC labor rates | | DAC labor rates | DAC labor rates | DAC labor rates |
| | Nonlabor | Actual cost | | Actual cost | Actual cost | Actual cost[c] |
| | Internal bills/service cost centers | N/A | | | | |

NOTES:
[a] DAC in RTC's Center Support and Command offices and DAC labor for test development and acquisition plan (TDAP) funded by provider; otherwise funded through indirect assessments.
[b] Some contractors in RTC's Center Support and Command offices and contractor labor for TDAP funded by provider; otherwise funded through indirect assessments.
[c] Nonlabor costs for TDAP funded by provider; otherwise funded through indirect assessments.
Red indicates ATEC pays the cost with their appropriations. Blue indicates reimbursable customers pay.
MRTFB = major range and test facility base; DAC = Department of the Army Civilian; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center.

Just as with RDECOM, most costs charged to ATEC's appropriations, reimbursable customers, and indirect cost pools are actual costs, with civilian labor as the exception ("DAC Labor Rates" in Table B.5). Table B.6 shows how ATEC's labor rates are computed. Since ATEC operates within GFEBS, it has similar methods as RDECOM (i.e., faces-to-spaces average salaries). However, there are two major differences with how ATEC calculates rates. First, ATEC adds a leave factor of 18 percent of civilian labor rates to pay for the employees' leave, whereas RDECOM adjusts by a factor based on the productive work year rate.[5] Second, instead of performing contract modifications that allocate all costs of the modification to an effort, as at RDECOM, ATEC cites their direct funds on most contracts and allocates direct hours to its customers. Unlike most Army commands, ATEC requires most of its contractors to report hours worked, and this is tracked by WBS through the CIMS. By tracking contractor labor hours, ATEC can load indirect rates onto both civilian and contractor DLHs for non-MRTFB test centers and non-DoD customers at MRTFBs (RDECOM only loads them onto civilian hours).

[5] ATEC follows the FMR regulations that instruct DoD organizations to add 18 percent to civilian labor rates to fund leave and holidays (vol. 11a [010203A2]).

**Table B.6. ATEC Labor Rate Policies**

| | Category | ATEC HQ | MRTFB for DoD Customer | MRTFB for Non-DoD Customer or Outside MRTFB | AEC/OTC | RTC |
|---|---|---|---|---|---|---|
| Civilian labor rates | Salaries | Average actual salaries across cost center/activity type/band | | | | |
| | Benefits | Average actual benefits across cost center/activity type/band | | | | |
| | Leave | + 18% leave assessment | | | | |
| | Indirect assessment | N/A | | Tax on mission-funded activities | N/A | Tier 1/2 tax on mission-funded activities only |
| CTR labor rates | Contract cost allocation | Portion of actual contract cost[a] allocated to each effort by number of hours worked | | | | |
| | Indirect assessment | N/A | | Tax on mission-funded activities | N/A | Tier 1/2 tax on mission-funded activities only |

[a] Actual contract cost includes contractor salaries, benefits, leave, G&A, fees, and so on.
MRTFB = Major Range and Test Facility Base; DAC = Department of the Army Civilian; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center.

Table B.7 shows ATEC policies for funding other types of costs. As with RDECOM, ATEC does not charge for labor from military personnel. ATEC has more military personnel than RDECOM, but they are concentrated outside the test centers. Table B.8 shows the breakdown of ATEC's personnel in FY 2016. The MRTFB test centers had 86 military personnel compared with 2,291 civilians and 2,897 on-site contractors. Most of ATEC's 491 military personnel are in AEC (112) and OTC (214).

ATEC had some visibility into the supplemental costs they paid IMCOM. HQ ATEC, Electronic Proving Ground (EPG), and WSTC paid IMCOM $31,000, $120,000, and $604,000, respectively, using their appropriations. In addition, WSTC used $129,000 of customer reimbursable funding to pay IMCOM.

The remainder of this appendix uses the FY 2016 GFEBS data supplied by ATEC to measure costs to customers and ATEC's appropriations. As with RDECOM, ATEC lacked some visibility into some types of costs such as the cost of training,[6] as well as visibility into what other commands are paying. However, unlike RDECOM, ATEC can easily differentiate its contractor labor costs from its other nonlabor costs. Whereas the RDECOM data were also based on RDECOM's indirect budgets and are estimates set prior to the year of execution, all ATEC data is based on actual execution data from GFEBS.

[6] In the future, ATEC should be able to measure indirect costs of training since they have implemented a statistical internal order that measures indirect training on time cards.

## Table B.7. Other ATEC Cost Policies

| | Category | ATEC HQ | MRTFB for DoD Customer | MRTFB for Non-DoD Customer or Outside MRTFB | AEC/OTC | RTC |
|---|---|---|---|---|---|---|
| Sec. 219 | Civilian labor costs | N/A | | | | |
| | Other investment costs | | | | | |
| Indirect costs at least partially paid by another org. | Developmental assignments | DAC labor rates[a] | | DAC labor rates[a] | DAC labor rates[a] | |
| | DAU acquisition training | | | | | |
| | IMCOM/base support | IMCOM common level of support (supplemented by overhead or customer)[b] | | IMCOM common level of support (supplemented by overhead or customer)[b] | IMCOM common level of support (supplemented by overhead or customer)[b] | IMCOM common level of support (supplemented by overhead or customer)[b] |
| | MIL personnel | Military pay[c] | | | | |
| | ACC (contracting) | Core support (supplemented by overhead)[d] | | Core support (supplemented by overhead)[d] | Core support (supplemented by overhead)[d] | Core support (supplemented by overhead)[d] |
| | LCMC (e.g., TACOM) | N/A | | | | |
| Other | Net operating result | N/A[e] | | | | |
| | HQ costs | N/A | | | | |

NOTES:
[a] For external assignments, gaining organization can also pay for part or all of the assignee's labor costs.
[b] Base support costs generated by a single test are charged to customer (see "Nonlabor" row of previous matrix).
[c] The FMR requires non-DoD reimbursement of military pay (see FMR, vol. 11a [010203B2]; FMR, vol. 15 [070203]), but the commands told us that GFEBS lacks capability.
[d] Only some organizations supplement core support (based on negotiation).
[e] Goal is revenue = costs. Rates and indirect budgets managed to minimize variance.
Red indicates ATEC pays the cost with their appropriations. Blue indicates reimbursable customers pay. Orange indicates the Army or other Army organizations pay.
DAC = Department of the Army Civilian; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center; DAU = Defense Acquisition University; IMCOM = Installation Management Command; LCMC = Life Cycle Management Center; MIL = military; ACC = Army Contracting Command; TACOM = Tank-automotive and Armaments Command; HQ = headquarters.

## Table B.8. ATEC Personnel Breakdown, FY 2017

| | HQ ATEC | MRTFB | AEC | OTC | RTC | Total |
|---|---|---|---|---|---|---|
| Military Personnel | 53 | 86 | 112 | 214 | 26 | 491 |
| Civilian Personnel | 217 | 2,291 | 303 | 314 | 316 | 3,441 |
| On-site Contractors | 32 | 2,897 | 115 | 311 | 818 | 4,173 |
| **Total** | **302** | **5,274** | **530** | **839** | **1,160** | **8,105** |

SOURCE: ATEC Manpower Strength as of end of March 2017; provided by ATEC on April 13, 2017.
NOTES: HQ ATEC includes personnel from Joint Test Element; MRTFB = major range test and facility base; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center.

**Table B.9a. ATEC Cost Breakdown by Funding Source, FY 2016: Summary ($Millions unless denoted as $k = $Thousands)**

| | | Activity | | | | | | Total | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Category | ATEC HQ | MRTFB for DoD Customer | MRTFB for Non-DoD Customer | AEC | OTC | RTC | Approp | Reimb | |
| | Sec. 219 tax | N/A | | | | | | N/A | | N/A |
| Mission costs | Civilian labor | $56k, $12k | $0.7, $95.6 | $10.6 | $33.0, $5.1 | $14.2, $0.6 | $0.3, $19.6 | $48.3 | $131.5 | **$179.8** |
| | Mission-specific training: Labor | | | | | | | | | |
| | Mission-specific training: Nonlabor | N/A | $3k | N/A | N/A | $27k | N/A | N/A | $30k | **$30k** |
| | CTR labor | $0.2, $1.7 | $1.2, $182.4 | $27.1 | $2.1, $19.1 | $14.3 | $4.6, $67.9 | $8.1 | $312.7 | **$320.8** |
| | Nonlabor | $22k, $33k | $0.2, $14.7 | $3.4 | $1.6 | $3.4 | $45k, $9.4 | $277k | $32.5 | **$32.8** |
| | Cost transfer (mostly nonlabor) | | $0.1, $23.8 | $3.6 | | $2.2 | $9.3 | $145k | $38.8 | **$38.9** |
| | Indirect assessment | | $25.3 | $6.9 | | $146k | $53.5 | | $85.8 | **$85.8** |
| Indirect costs | Civilian labor | $34.2 | $159.6 | | $12.4 | $22.3 | $16.5 | $245.0 | | **$245.0** |
| | General training: Labor | | | | | | | | | |
| | General training: Nonlabor | $190k | $130k | | N/A | N/A | $3k | $323k | | **$323k** |
| | CTR labor | $13.3 | $233.2 | | $5.1 | $18.2 | $62.2 | $332.1 | | **$332.1** |
| | Nonproductive time | Included in DAC labor | | | | | | | | |
| | Nonlabor | $9.3 | $73.0 | | $827k | $2.9 | $5.6 | $91.7 | | **$91.7** |
| | Cost transfer (mostly nonlabor) | $224k | –$27.7 | | $16k | –$2.2 | –$9.3 | –$39.0 | | **–$39.0** |
| Totals | Total mission costs | $0.3, $1.8 | $2.3, $316.5 | $44.8 | $35.1, $25.8 | $14.2, $20.5 | $5.0, $106.3 | $56.8 | $515.5 | **$572.4** |
| | Indirect assessment | | $25.3 | $6.9 | | $146k | $53.5 | | $85.8 | **$85.8** |
| | Total indirect costs | $57.3 | $438.2 | | $18.4 | $41.3 | $75.0 | $544.4 | $85.8 | **$630.2** |
| | Split of indirect costs | 100% | 93%, 6% (DoD), 2% (Non) | | 100% | 99.6%, 0.4% | 29%, 71% | 86% | 14% | |
| | Uncategorized costs | $1.3 | $6.3 | | $0.3 | $0.4 | $7.5 | $15.8 | | **$15.8** |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: Red indicates ATEC pays the cost with their appropriations. Blue indicates reimbursable customers pay. Black indicates a total or indirect cost pool that combines appropriations and customers' funds.
CTR = contractor; DAC = Department of the Army Civilian; MRTFB = major range test and facility base; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center.

**Table B.9b. ATEC Cost Breakdown by Funding Source, FY 2016: ATC, EPG, and WDTC ($Millions unless denoted as $k = $Thousands)**

| | | ATC-DoD | | ATC-Non-DoD | EPG-DoD | | EPG-Non-DoD | WDTC-DoD | | WDTC-Non-DoD |
|---|---|---|---|---|---|---|---|---|---|---|
| | Category | Approp | Reimb | Reimb | Approp | Reimb | Reimb | Approp | Reimb | Reimb |
| | Sec. 219 tax | N/A | | | | | | | | |
| Mission costs | Civilian labor | $491k | $35.0 | $2.4 | $178k | $6.4 | $588k | N/A | $5.3 | $2.6 |
| | Mission-specific training: Labor | | | | | | | | | |
| | Mission-specific training: Nonlabor | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | CTR labor | $863k | $58.3 | $4.2 | $247k | $18.4 | $879k | $17k | $8.5 | $5.9 |
| | Nonlabor | $128k | $4.7 | $201k | N/A | $958k | $54k | $28k | $1.2 | $1.2 |
| | Cost transfer (mostly nonlabor) | N/A | $32k | $122k | $20k | $88k | –$5k | $27k | $756k | $522k |
| | Indirect assessment | | $5.1 | $1.9 | | $1.0 | $546k | | $66k | $171k |
| Indirect costs | Civilian labor | $45.2 | | | $13.5 | | | $9.0 | | |
| | General training: Labor | | | | | | | | | |
| | General training: Nonlabor | $2k | | | N/A | | | $113k | | |
| | CTR labor | $49.7 | | | $20.8 | | | $49.5 | | |
| | Nonproductive time | | | | | | | | | |
| | Nonlabor | $15.1 | | | $5.2 | | | $9.8 | | |
| | Cost transfer (mostly nonlabor) | –$163k | | | –$345k | | | –$1.3 | | |
| Totals | Total mission costs | $1.5 | $98.0 | $6.9 | $444k | $25.9 | $1.5 | $71k | $15.7 | $10.3 |
| | Indirect assessment | $6.9 | | | $1.6 | | | $237k | | |
| | Total indirect costs | $109.8 | | | $39.2 | | | $67.1 | | |
| | Split of indirect costs | 94% | 5% | 2% | 96% | 3% | 1% | 100% | 0% | 0% |
| | Uncategorized costs | $3.5 | | | $51k | | | $92k | | |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: Red indicates ATEC pays the cost with their appropriations. Blue indicates reimbursable customers pay. Black indicates a total or indirect cost pool that combines appropriations and customers' funds.
CTR = contractor; ATC = Aberdeen Test Center; EPG = Electronic Proving Ground; WDTC = West Desert Test Center.

**Table B.9c. ATEC Cost Breakdown by Funding Source, FY 2016: WSTC and YPG**
**($Millions unless denoted as $k = $Thousands)**

| | | WSTC-DoD | | WSTC-Non-DoD | YPG-DoD | | YPG-Non-DoD |
|---|---|---|---|---|---|---|---|
| | Category | Approp | Reimb | Reimb | Approp | Reimb | Reimb |
| | Sec. 219 tax | N/A | | | | | |
| Mission costs | Civilian labor | $16k | $29.5 | $3.5 | $21k | $19.4 | $1.5 |
| | Mission-specific training: Labor | | | | | | |
| | Mission-specific training: Nonlabor | N/A | $3k | N/A | N/A | N/A | N/A |
| | CTR labor | –$199k | $48.7 | $9.4 | $288k | $48.6 | $6.8 |
| | Nonlabor | $33k | $4.3 | $1.4 | $14k | $3.5 | $546k |
| | Cost transfer (mostly nonlabor) | $26k | $9.0 | $779k | $70k | $13.9 | $2.2 |
| | Indirect assessment | | $12.6 | $579k | | $6.5 | $3.8 |
| Indirect costs | Civilian labor | $60.1 | | | $31.8 | | |
| | General training: Labor | | | | | | |
| | General training: Nonlabor | $11k | | | $4k | | |
| | CTR labor | $54.2 | | | $58.9 | | |
| | Nonproductive time | | | | | | |
| | Nonlabor | $20.9 | | | $22.1 | | |
| | Cost transfer (mostly nonlabor) | –$9.8 | | | –$16.1 | | |
| Totals | Total mission costs | –$123k | $91.5 | $15.0 | $392k | $85.4 | $11.0 |
| | Indirect assessment | $13.1 | | | $10.3 | | |
| | Total indirect costs | $125.4 | | | $96.8 | | |
| | Split of indirect costs | 90% | 10% | 0% | 89% | 7% | 4% |
| | Uncategorized costs | $1.2 | | | $1.5 | | |

SOURCE: Analysis of GFEBS data provided by ATEC on June 16, 2017.
NOTES: Red indicates ATEC pays the cost with their appropriations. Blue indicates reimbursable customers pay.
Black indicates a total or indirect cost pool that combines appropriations and customers' funds.
CTR = contractor; WSTC = White Sands Test Center; YTC = Yuma Test Center.

ATEC provided the study team with additional data showing average salaries, benefits, leave, and indirect assessments, summarized in Table B.10. Actual leave rates at ATEC were about 17 percent; thus, ATEC's rates slightly over collected—and overcharged reimbursable customers—to pay for leave. In addition to indirect rates, ATEC also charged non-DoD customers for Unfunded Civil Service Retirement (UCSR).[7]

[7] UCSR is equivalent to the DoD (Comptroller) Unfunded Civilian Retirement Factor but uses a different base (total compensation including benefits and leave rather than just salary), so it is a slightly smaller percentage.

## Table B.10. ATEC Average Labor Rates Components

| | Category | ATEC HQ | MRTFB for DoD Customer | AEC/OTC | RTC | MRTFB for Non-DoD Customer or Outside MRTFB |
|---|---|---|---|---|---|---|
| Civilian labor rates | Salaries | FY16 average salary: $42.95/hour | | | | |
| | Benefits | FY16 average benefits: $13.53/hour | | | | |
| | Leave | 18% leave assessment ($10.17/hour) (actual leave in FY16 was 17.06%) | | | | |
| | Indirect assessment | N/A | | | FY17: $19.50 to $50.00/DLH) | FY17: $4.28 to $150.00/DLH + UCSR (~5%) |
| CTR labor rates | Contract cost allocation | Portion of actual contract cost allocated to each effort by number of hours worked | | | | |
| | Indirect assessment | N/A | | | FY17: $19.50 to $50.00/DLH) | FY17: $4.28 to $150.00/DLH + UCSR (~5%) |

SOURCE: Analysis of GFEBS Payroll Data Provided by ATEC on July 20, 2017.
NOTE: UCSR = Unfunded Civil Service Retirement; CTR = contractor; DLH = direct labor hour; MRTFB = major range test and facility base; AEC = Army Evaluation Command; OTC = Operational Test Command; RTC = Redstone Test Center.

# Appendix C. Indirect Budget Processes at RDECOM and ATEC

This appendix discusses the processes that RDECOM and ATEC use for developing indirect budgets.

Like RDECOM's recent evolution in developing standardized cost accounting rules, RDECOM has been standardizing their budgeting processes and tools across their labs. However, RDECOM has not documented the standardization of budget processes as well as the standardization of cost accounting policies in the AMC CONOPS. Since discussions of budgeting processes in the AMC CONOPS lack detail, we relied primarily on discussions with HQ RDECOM, AMRDEC, and TARDEC to understand these processes and used insights from discussions with their customers to develop this chapter.

Budgeting processes for ATEC's MRTFBs, on the other hand, were standardized after Congress standardized MRTFB funding rules in the FY 2003 NDAA. ATEC has no formal documentation of its budgeting processes analogous to ATEC 37–11, which documents policies for ATEC's rates and cost accounting; however, ATEC has developed a standard set of PowerPoint slides to explain these processes. Our understanding of ATEC's processes relies primarily on these slides plus discussions with HQ ATEC. In addition, we talked to RTC, who is outside the MRTFB and does not have well-documented policies, to better understand their processes.

## Indirect Budgeting at RDECOM

RDECOM has a seven-step process to develop indirect budgets:[1]

1. **RDECOM Budget Call Letter**. About five months prior to the start of the fiscal year (e.g., the FY 2018 letter was released in May 2017), HQ RDECOM releases a budget call letter highlighting policies that need to be followed. HQ determines assumptions the labs should use when developing budgets, such as the expected cost of living adjustment. The letter will highlight other policies and provide top-down guidance, such as the ranges and rules for setting Section 219 recoveries.

[1] RDECOM helped develop the AMC CONOPS to standardize cost accounting policies and procedures across RDECOM and AMC. However, the document says very little about how to determine what to include in these budgets. As an example, the CONOPS "Indirect Process Flow" includes up to 23 steps and decision points for developing indirect rates, but only one step, "Funds Center Determine Line Item Costs," focuses on developing the content of those budgets. To provide the study team with a better understanding of this step of the budget process, RDECOM created detailed documentation, and the study team had follow-up discussions with HQ RDECOM, AMRDEC, and TARDEC.

2. **RDEC and ARL Guidance**. Lab leadership reviews the budget call letter as well as the policies in effect across the Army, AMC, and RDECOM to determine additional guidelines the budgeting process must follow. As an example, HQ RDECOM allows each lab to choose whether to participate in the Section 219 program and set its own Section 219 rate as long as it is within constraints set by Congress.
3. **"Bottoms-Up" Budget Build**. In this step, managers of the indirect cost pools establish an initial set of indirect budgets by allocating personnel to indirect pools or direct work and estimating nonlabor indirect budgets. This step is discussed in more detail below.
4. **RDEC/ARL Internal Review and Approval**. Each organization sets its own processes for approving the indirect budgets. Budgets are typically reviewed and approved by financial staff and technical leadership, who assess financial and technical risk.
5. **HQ RDECOM (G-8) Review**. The budgets are reviewed by the G-8 in HQ RDECOM. RDECOM personnel explained this was a high-level review to ensure guidance from the budget call was followed and to ensure that calculated rates and coding within spreadsheets are accurate. This review can also flag cases where costs and rates seem unreasonable (for example, by comparing to previous year's rates and costs), but this is not the focus.
6. **RDECs and ARL Finalize Budgets**. Budgets can be adjusted over time following feedback. Once they are finalized, they are sent to AMC for high-level validation focusing on whether the calculations and spreadsheets are correct. Finally, the costing sheets that include the initial indirect rates and rules for collecting those rates are sent to DASA-CE who enters them into GFEBS.
7. **DD 1144s and Memoranda of Agreements**. Once indirect budgets are finalized, indirect rates have been calculated and entered into GFEBS, RDECOM populates customer agreements detailing the rates and cost estimates for the next fiscal year.

### *RDECOM Customer Engagement*

The study team met with RDECOM and some of their customers to learn more about how RDECOM engages with customers throughout the budgeting process. In some cases, we received conflicting responses. All the customers with whom we spoke acknowledged that RDECOM is forthcoming when the customer has questions regarding costs or challenges costs or rates. Customers indicated this type of engagement happened frequently, especially as RDECOM implemented the AMC CONOPS, which often led to the price surprises discussed in Appendix D. Customers had mixed responses about how well RDECOM personnel explained the budget processes and answered customer questions. In general, customers who experienced bigger negative surprises were more displeased with the quality of explanation from RDECOM personnel.

Some of the RDECOM organizations with whom we spoke have customer liaisons, who are responsible for proactively socializing rates with customers. We were told this socialization occurs when the budgeting process is 85 to 90 percent complete; the rates have been largely set at this point in the process. Liaisons provide PowerPoint slides explaining the rates structure, spreadsheets that can go to the finest levels of detail, and whatever other materials were requested by the customer. Some customers had different views on how proactive RDECOM

personnel were. While some customers acknowledged that RDECOM was proactive, other customers said that they only had discussions with RDECOM on the customer's request.

One common theme observed by the study team throughout our discussions with RDECOM and the customers is customers have very little direct input into the indirect budgeting process. Some customers explained RDECOM tells them what the rates are but will not do anything to change them. RDECOM personnel said they have little ability to change rates during the budgeting process to respond to customer concerns, but customer concerns can impact indirect budgets over the long run.[2] According to customers and stakeholders, disagreements about indirect budgets have led some customers to be hesitant to sign the DD 1144s and Memoranda of Agreement (MOAs).

### *RDECOM Budgeting Tools*

Because RDECOM helped develop the AMC CONOPS, they have also standardized their budgeting tools. Prior to the AMC CONOPS, RDECOM organizations developed their own budgeting tools. Sometimes organizations used multiple budget tools. The rollout of the AMC CONOPS also led to adoption of FIRE across RDECOM. Initially developed at ARDEC, FIRE was adopted by the Edgewood Chemical Biological Center (ECBC) and is being adopted at the other RDECOM organizations as well. FIRE provides a standard reporting template that can potentially increase transparency by management, customers, and stakeholders who interact with multiple RDECOM organizations. In addition, its standard reports integrate into cost sheets supplying GFEBS with indirect rates and into customer agreements.

### *RDECOM Bottoms-Up Budgeting*

RAND Arroyo Center identified three budgeting methodologies that RDECOM bottoms-up budgeting used to develop its budgets.

#### RDECOM Bottoms-Up Budgeting: Civilian Labor

As part of its budgeting process, RDECOM organizations budget the expected workload of its civilian workforce over the next year. FIRE aids this budgeting process that is conducted for all individuals and all workload—both indirect and direct—to ensure all personnel are fully budgeted and not double counted.

RDECOM organizations start by loading personnel rosters into FIRE along with current faces-to-spaces labor rates, which are used to estimate labor costs. Personnel are allocated a

[2] As an example, AMRDEC decided not to charge customers for Section 219 when it was implemented in FY 2010 and FY 2011 due to customer pushback. AMRDEC participated in FY 2015 and FY 2016 but reduced its participation substantially in FY 2017. Throughout this study, AMRDEC has been assessing whether to participate in the Section 219 program. However, as of our most recent discussion, AMRDEC personnel were planning to implement the charges due to increased congressional emphasis on the program.

percentage of indirect time. Many positions, like human resources and financial operations, are 100-percent indirect positions. Other personnel can spend some fraction of their time working on indirect efforts. One limitation of FIRE is it lacks a justification or explanation of these allocations of hours. While justification for these allocations is apparent to the indirect cost pool managers who have detailed knowledge of what personnel are doing, it much less transparent to others. For example, there is no way to differentiate hours that are due to management time versus hours for financial work versus hours for training.

RDECOM, as well as other DoD labs we spoke to, consistently maintained that there is little to no "idle time" funded through indirect costs. Labs maintain that their labor force has flexible skills and that the contractor workforce provides flexibility so personnel can be redeployed easily if funding dries up.

FIRE automates calculations of cost by pricing the expected indirect hours worked in the indirect cost pools using hourly labor rates.

Regarding nonlabor costs—RDECOM explained they have two different types of nonlabor costs, each with its own budgeting process: (1) costs that are driven by the number of personnel the organization employs and (2) future commitments, which are those that are not driven by the number of personnel. Personnel-driven nonlabor costs and future commitments are discussed in the next two sections.

### RDECOM Bottoms-Up Budgeting: Personnel-Driven Nonlabor Costs

Personnel-driven costs include categories like travel and supplies since they scale with the number of personnel. In the past, some organizations would budget these costs at a very detailed level; for example, by budgeting for individual trips for individual people. However, this level of budgeting proved problematic since trips could not be identified far enough in advance and costs for trips, like airfare, have a high degree of uncertainty. Instead, managers estimate a total cost per person based on last year's spending, current execution, and projections of spending for the remainder of the fiscal year.

Any calculations managers make to determine these costs are produced outside of FIRE. FIRE typically includes the total estimate of a type of cost for each organizational unit. An outside observer seeking to understand why a particular cost pool budgeted $10,000 for travel must ask the cost pool manager because FIRE does not contain such information. FIRE does include the ability to budget nonlabor costs at the line item, breaking down categories of costs into more discrete budgets, but we did not identify instances where this was used to justify personnel-driven nonlabor costs.

### RDECOM Bottoms-Up Budgeting: Future Commitments

The second category of nonlabor costs included in indirect budgets is future commitments. These are individual costs that can be identified with a high degree of reliability.

An example of this type of cost provided by TARDEC are printing costs. One of their cost pools budgeted $70,000 for printing and reproduction costs. This printing budget was built from two line items—a printing contract estimated to cost $50,000 and reimbursable printing services from other Army organizations estimated to cost $20,000.

As mentioned above, FIRE allows organizations to enter line items at this level of detail, which it will use to build the overall budget. However, there is a high degree of variance in how thoroughly the organizations do include these details in FIRE. The study team, for example, could not identify these printing costs in the FIRE budgets that RDECOM provided. One cost pool contained $50,000 in printing and another contained $20,000 in printing, but no details were provided in FIRE.

The two budgeting methods are sometimes interchangeable for each other. For example, one cost pool could potentially estimate its costs to purchase new computers as an average cost per person, while another could identify employees who needed new computers over the next fiscal year and budget on a line-item level. Regardless of which method is used, based on the study team's review of FIRE, it is unlikely that a third party could understand the reasoning behind these budgeting decisions without asking a manager.

### *Validation*

RAND Arroyo Center found that RDECOM engaged in only limited validation of budgets. There is some amount of validation occurring in the reviews conducted internally by the organization developing them and by RDECOM in steps 4 and 5 of the budgeting process, but these tend to be focused at a high level.

The most valuable validation is comparing what was budgeted with what was spent each year. Since RDECOM requires that its costs equal its revenues across each indirect cost pool, variance management serves as a type of high-level validation. However, this analysis is at the aggregate level, and fluctuations from aggregate budgets are driven by fluctuations in revenue rather than fluctuations in indirect spending. In other words, revenue cannot be predicted exactly during the budget period since the number of hours worked is unknown. RDECOM attempts to keep rates steady throughout the year; hence it must adjust its indirect spending to match its actual indirect revenue.

The study team saw no evidence that RDECOM organizations monitored actual spending on either a line-item basis or at an aggregate category of spending (like travel or supplies). Such an analysis could potentially help RDECOM better understand how it is spending its indirect funding, identify areas where costs need to be controlled better, and identify opportunities for future improvements in efficiency or efficacy.

### *Limitations and Drawbacks of the RDECOM Indirect Budgeting Processes*

The study team found that RDECOM improved their practices over the past few years as they developed and adopted the AMC CONOPS. However, RDECOM can improve further.

Budgeting processes and tools are not detailed enough to validate indirect budgets or understand drivers of cost growth. Further, there is little to no independent oversight of these budgets.

RDECOM has implemented FIRE across the command to create budgets. FIRE helps implement the AMC Reimbursable CONOPS by requiring each RDECOM organization budget for indirect costs in tiered cost pools. FIRE also provides tools for analyzing execution data from GFEBS, which when coupled with FIRE's budgeting functions could be used to validate execution of budgets.[3]

RAND Arroyo Center found that RDECOM's use of FIRE helps implement the CONOPS and fills gaps in GFEBS capability, but more maturation (or a GFEBS standard solution) is needed. As the study team learned about RDECOM's budgeting processes and asked RDECOM to provide data, we identified several shortcomings that can be improved in the future and increase RDECOM's ability to provide answers to customers and oversight providers.

- FIRE appears useful in labor budgeting by requiring each person's capacity to be fully allocated in the budgets; that is, to direct or (possibly multiple) indirect cost pools. However, FIRE does not collect any justification for why a person is budgeted as indirect or what functions they perform, and this makes it difficult to surmise what factors are driving indirect labor budgets.
- FIRE is not as widely accessible to customers and oversight providers as GFEBS.
- FIRE's outputs are difficult to understand when used in lab-wide analysis. For example, RDECOM provided printouts to the study team for 2017 FIRE budgets that ranged from 70 pages at CERDEC to 390 pages at ARDEC. The data do not transfer automatically into spreadsheet programs.
- FIRE does not require any details about nonlabor costs. Budgets in FIRE only require an estimate of the size of various categories of costs. On some categories of cost that are composed of many small transactions (e.g., "travel" and "supplies"), an estimate of the total cost of the category is likely sufficient. However, for other categories such as "contracts" that often have large transactions, it would be useful to be able to identify individual contracts to better understand how their costs change over time. There is a trade-off between collecting detailed data and the cost of that detail. RDECOM should standardize its reporting of nonlabor costs with this trade-off in mind.
- Data sources provided from RDECOM have often been inconsistent with each other. When we have asked RDECOM about these inconsistencies, RDECOM has presented plausible explanations (e.g., FIRE budgets evolve over time and sometimes RDECOM's data are based on execution data from GFEBS while other times they are based on FIRE budgets). However, a major advantage of a standardized, widely accessible system like GFEBS is that anybody with GFEBS access can run analyses for themselves if given a

[3] The business intelligence (BI) module in GFEBS provides the primary tool for analyzing execution data. However, the various organizations we talked to have found BI to be slow and/or lacking in functionality; hence organizations have created their own work-arounds for analyzing GFEBS data. For example, RDECOM has adopted FIRE. ATEC generally uses Microsoft Excel in conjunction with GFEBS. RTC uses Pro3 software to analyze downloaded GFEBS data on the fly.

list of query parameters. This transparency allows validation of analyses and increases confidence in the data.

## Indirect Budgeting at ATEC

ATEC has a high degree of standardization in budgeting processes for its MRTFBs that are a result of DoD-wide standardization through common MRTFB funding rules.

ATEC breaks its MRTFB indirect budgets for operational costs[4] into three categories, as shown in Table C.1. The following sections will explain how ATEC budgets each type of indirect cost.

**Table C.1. MRTFB Indirect Operational Costs Budget Categories**

| | Indirect Labor Costs | Nonlabor Indirect Costs | |
|---|---|---|---|
| | **Staff Indirect Charges** | **Test Capabilities Sustainment (TCS)** | **Nonfacility/Nonlabor Costs (NFNL)** |
| Contents | Civilian and contractor hours not in direct support of a customer test | Annual/periodic sustainment requirements for the 321 test capabilities | Nonlabor costs not in support of a customer test (e.g., equipment, information technology [IT], training, travel) |
| Budget inputs | • Planned number of civilians<br>• Salaries<br>• Historical direct vs. indirect<br>• Labor hour projection model | • Database documents 321 test capabilities<br>• Constant year to year<br>• DUSA-TE recent validation | • 1-N list based on historical averages, updated annually |

### *ATEC Indirect Operational Budgets: Staff Indirect Charges*

The first category of indirect cost budgeted by the MRTFBs is indirect labor costs. These include the hours both civilians and contractors charge that are not in support of a customer test. Contractor indirect hours are included because ATEC receives information about its staff augmentation contractors via time-card charges those contractors record in CIMS; hence, it can manage these hours in a similar manner as it manages its civilian employees. In contrast to RDECOM, ATEC acknowledges their personnel have idle time, which can result from factors

[4] ATEC receives institutional funding to pay for most of these costs through RDT&E PE 0605601A, "Army Test Ranges and Facilities." This PE is the third largest in the Army's RDT&E budget and estimated to be $308 million in the FY 2018 President's Budget. The funds largely pay for the indirect costs at the MRTFBs, but they can also be used for non-MRTFB capabilities as well. The exception is WDTC at DPG, which receives funding from OSD for its chemical/biological defense mission.

like weather that delay tests.[5] Since ATEC has relatively little ability to predict its workload in advance of the year of execution, and because factors like the weather are inherently unpredictable, ATEC has developed statistical methods to estimate the resources it needs to fund indirect labor costs:

1. **Estimation of Overall Test Workload**. ATEC created the ATEC workload projection model to produce estimates of each test center's workload over the next five years. The model was created using historic observations about the relationship of ATEC's workload to research, development, and acquisition budgets. Between FY 2011 and FY 2015, ATEC calculated that their model fell short of actual reimbursable labor hours by 2 to 6 percent (a 4-percent shortfall on average).
    - Example: Model estimates 1.72 million reimbursable labor hours at one test center.

2. **Estimation of Civilian Indirect Workload**. ATEC estimates its civilian indirect workload based on the number of civilian personnel it has in a test center, the standard number of hours worked in a year (1,740), and the historic rate at which civilians charge indirect.
    - *Indirect hours*: As an example: A test center has 760 civilian personnel working 1,740 hours in a normal year and historically charges 45 percent of regular working hours to indirect costs, equaling about 595,000 indirect hours.
    - *Overtime hours*: Continuing the previous example: The 760 personnel work about 727,000 reimbursable labor hours but historically work an additional 3 percent in overtime for a total of 749,000 reimbursable labor hours.

3. **Estimation of Contractor Indirect Workload**. ATEC estimates the number of contractors they must hire to meet remaining direct workload. Then they calculate the contractor indirect workload based on the standard number of hours contractors work in a year (1,880) and the historic rate at which contractors charge to indirect cost pools (20 percent).
    - Example: Of the 1.72 million reimbursable labor hours, civilians are expected to work about 749,000 hours, leaving contractors to work about 971,000 hours. This requires 646 contractors since each contractor can work on average 1,500 (1,880 × 80 percent) reimbursable hours each year.
    - Example: These 646 contractors would charge about 243,000 indirect hours each year.

ATEC would then estimate the costs of these indirect labor hours to determine the funds needed from the budget.

[5] Idle time is often an indirect cost. However, if idle time is caused by a customer (e.g., a customer has scheduled range time but cannot get its equipment ready for the test and ATEC cannot reschedule), then DoD rules allow the idle time to be charged to customers.

One potential danger of this statistical methodology is that it uses historic averages to determine budgets. It is possible that historically ATEC could have been more efficient in spending its indirect labor hours, and it is also possible that changes in policies and technology could lead to changes in indirect labor hour shares. To improve its management and control of indirect labor hours, ATEC is implementing statistical internal orders that provide ATEC with increased visibility on what these indirect hours are actually spent on.

### *ATEC Indirect Operational Budgets: Test Capabilities Sustainment*

ATEC budgets to two categories of indirect, nonlabor costs. Test capabilities sustainment (TCS) are the annual and periodic sustainment requirements for ATEC's test capabilities. ATEC maintains a database of its 321 test capabilities,[6] documenting what activities (e.g., maintenance) are needed each year to sustain their capabilities, then calculates the associated costs to develop its funding requirements. ATEC told us each capability has stable sustainment costs over time, and these costs have been validated by DUSA-T&E.

ATEC has found that they usually do not receive the amount of institutional funding required to pay for all of their estimated requirements. TCS is the only category of funding that ATEC can easily underfund by performing less than the required amount of sustainment on their capabilities. To minimize the risk of underfunding capability sustainment, ATEC engages in a risk management strategy identifying all unfunded requirements. ATEC assesses these unfunded requirements as high, medium, or low risk based on potential financial and timeline impacts to customers and programs along with other factors such as alternative sources of capabilities. ATEC also identifies a risk management strategy for each unfunded requirement and assesses whether TRMC approval is necessary since TRMC has oversight authority for the MRTFBs.

### *ATEC Indirect Operational Budgets: Nonfacility/Nonlabor Costs*

The final category of indirect costs ATEC budgets is nonfacility/nonlabor (NFNL) costs. These costs are similar to the nonlabor costs at RDECOM. ATEC uses spreadsheets combined with analysis of historic costs in GFEBS to estimate costs in future years.

Cost estimates are based on historic costs from GFEBS. ATEC estimates cost inflation in the future, which is based on simple assumptions (e.g., a 3-percent inflation rate) rather than a more complicated model based on workload.

Like RDECOM, ATEC budgets NFNL costs using a combination of aggregate costs and line items. Travel is an example of a category of NFNL costs that is managed at the aggregate level. But ATEC breaks down many categories into line items.

[6] ATEC's "10-series" regulations for its test centers define these capabilities and assign responsibilities for these capabilities to its test centers.

### *ATEC Indirect Budget Decision Rights*

Although ATEC has a standard set of budget methodologies to determine indirect funding at MRTFBs, ATEC does not require ranges to spend the indirect funds according to the budget. Test center commanders are allowed to adapt their spending as they deem necessary. ATEC management told us commanders need to be allowed to adapt to circumstances that cannot be predicted when funds are budgeted. For example, weather can have a big impact on range operations and programmatic changes can impact test schedules and Army testing priorities. The underfunding of indirect funding requirements is another driver of the decision to allow test center commanders significant discretion in how they use their money—underfunding creates risks, and commanders can better manage the risk with discretion.

### *ATEC Budget Oversight*

ATEC management told the study team its customers understand the overall funding model (i.e., customers pay for direct costs but not indirect costs) but largely do not understand indirect budgeting processes. Customers do not contribute to indirect costs; thus, they do not need to understand budgeting processes. In discussions with customers, the study team heard no concerns about ATEC's indirect costs and only limited concerns about ATEC's direct costs.[7]

Budget oversight for ATEC's indirect funding parallels typical government organizations receiving appropriations. Oversight is focused in the Army from DUSA-T&E and from DoD through TRMC, which was established in the FY 2003 NDAA in part to provide oversight and certify testing budgets (see Appendix E for a complete discussion). The concentration of this oversight and the empowerment of these overseers appear to be considerably more effective than customer oversight of indirect costs at RDECOM. Whereas ATEC has two major overseers of its activities that can invest in being intimately aware of ATEC's activities, RDECOM says it has thousands of customers who cannot afford to follow RDECOM's indirect practices in any level of detail. Further, ATEC's overseers have the ability to impact ATEC's budgets, while there is no clear way for RDECOM's customers to impact RDECOM's budgets short of choosing an alternative supplier.

### *Indirect Budgeting at Redstone Test Center*

RTC's indirect budgeting processes are less documented than ATEC's MRTFBs. RTC personnel provided the study team with written explanations of its budgeting processes and answered our questions during our visits.

Overall, RTCs processes are a hybrid of MRTFB's and RDECOM's processes. RTC develops an internal operating budget in the summer preceding the fiscal year.

[7] Most customers voiced no concerns about ATEC's direct costs, but some customers voiced concerns that ATEC costs less than its estimates but returns funding too close to the end of the fiscal year for the customer to use it.

RTC uses the same predictive model as the rest of ATEC to estimate its total workload. However, because RTC charges multiple rates (see Appendix B), it budgets hours for individuals like RDECOM (but for both civilian and contractor personnel), whereas the ATEC predictive model estimates aggregate hours statistically. These labor hour estimates allow RTC's directorates to budget the labor hours that must be paid by the indirect cost pools and estimate the DLH base used to recover indirect costs within each indirect cost pool. Together, the indirect budgets and DLH estimates are used to calculate indirect rates used as a GFEBS input.

A major difference between RTC and ATEC's MRTFBs is sustainment costs. In the MRTFBs, sustainment costs are costs that must be spent; otherwise the MRTFB increases risk to the capability. A third option is available to RTC. Since their capabilities are not within the MRTFB, they can easily divest of capabilities or mothball capabilities. According to RTC management, these strategies are frequently used because they usually cannot afford to charge their customers for unutilized capabilities. RTC's managers believed it was rare for unutilized capabilities to be sustained as they are at the MRTFBs.

RTC uses Pro3 software to budget its indirect cost pools and analyze execution data from GFEBS. Further, RTC established a system of indirect WBS elements to help budget and track the execution of indirect budgets.[8] Separate elements exist for each directorate and for eight different categories of indirect cost: G&A, facilities and maintenance, logistics, IT, test technology, test operations, support operations, and training.

### *ATEC Investment Budgets*

The study team did not discuss in detail ATEC's processes for budgeting investment costs. There are a variety of different sources for investment funding. A major source of Army funding is PE 0604759A, "Major T&E Investment." Some of these funds (e.g., Project 628, Developmental Testing Technical Test Technology and 62C Modeling and Simulation Instrumentation) provide appropriations directly to ATEC for investments and can be used for both MRTFB and non-MRTFB capital costs. Appropriations are also provided to others, particularly PM-ITTS who can provide ATEC with equipment without any funds passing through ATEC. Additionally, DoD provides funding for investment costs, most notably through the CTEIP program.

ATEC personnel indicated ATEC uses a competitive process to determine how to use funding to pay for investments. Each test center tracks investment needs through its strategic planning processes, and ATEC, at the command level, develops a prioritized list to guide funding decisions.

[8] Other ATEC organizations use statistical internal orders to track indirect efforts, but RTC managers found that using WBS elements was preferable.

# Appendix D. RDECOM "Net Zero" Analysis

As discussed in Appendix A, customers and stakeholders expressed a high level of concern for RDECOM's indirect rates. As Table A.6 showed, customers fund about two-thirds of RDECOM's indirect costs; these customers indicated they had a variety of experiences with the indirect rates that they paid. Some customers indicated their rates had been relatively stable over the past few years, while other customers indicated prices rose sharply when labs implemented the AMC CONOPS. To better understand how indirect costs changed, RDECOM provided data about indirect costs from FY 2013 to FY 2016. Table D.1 shows how total indirect costs at each lab had changed over this period. Overall, indirect recoveries were stable between FY 2013 and FY 2015, although there were larger variations in individual labs. However, in FY 2016 indirect collections spiked at many labs across RDECOM.

**Table D.1. Indirect Collections (Excluding Sec. 219) in RDECOM, FY 2013 to FY 2016 ($Millions)**

| Organization | FY 2013 | FY 2014 | FY 2015 | FY 2016 | Δ FY 2013–FY 2015 | Δ FY 2015–FY 2016 |
|---|---|---|---|---|---|---|
| AMRDEC | 72.9 | 71.7 | 75.2 | 81.9 | 3% | 9% |
| ARDEC | 146.3 | 147.1 | 154.3 | 161.6 | 5% | 5% |
| ARL | 116.4 | 114.1 | 110.4 | 122.2 | −5% | 11% |
| CERDEC | 49.1 | 49.6 | 51.6 | 69.9 | 5% | 35% |
| ECBC | 71.9 | 70.9 | 63.8 | 63.5 | −11% | −1% |
| NSRDEC | 12.3 | 13.7 | 15.3 | 28.3 | 24% | 85% |
| TARDEC | 44.4 | 43.2 | 47.9 | 59.1 | 8% | 23% |
| **Total** | **513.3** | **510.3** | **518.5** | **586.5** | **1%** | **13%** |

SOURCE: RDECOM analysis of indirect cost pool data.
NOTES: AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; ARL = Army Research Laboratories; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

The study team asked RDECOM management why indirect collections increased so much in FY 2016. RDECOM asserted that total costs to the Army had been relatively flat other than inflation, and the increases in indirect collections were due to costs shifting into the cost pools. RDECOM offered three drivers of these increases and why they had an overall "net zero" impact to Army costs. We discuss and assess RDECOM's assertions in the following sections.

## RDECOM Raised Indirect Rates to Compensate for Drops in Appropriations for Indirect

The first explanation RDECOM provided for increases in indirect costs was their BA 6.6 appropriations for indirect costs (PE 0605801A, "Programwide Activities") were reduced. Table D.2 shows these appropriations were cut significantly between FY 2014 and FY 2017. RDECOM was unable to offer an explanation of why the funding was cut, citing a lack of visibility for the reasons behind HQDA funding decisions.[1] The bottom two rows of Table D.2 show overall funding levels for BA 6.6 appropriations and RDT&E appropriations, which have little relationship to the pattern seen at RDECOM.

**Table D.2. RDECOM Changes in Appropriations for Indirect Costs from BA 6.6 Funds ($Millions unless denoted as B = $Billions)**

| Organization | FY 2014 | FY 2015 | FY 2016 | FY 2017 | Δ FY 2014–FY 2017 |
|---|---|---|---|---|---|
| AMRDEC | 13.5 | 8.7 | 9.4 | 0 | −100% |
| ARDEC | 8.4 | 5.8 | 5.1 | 3.1 | −63% |
| CERDEC | 5.7 | 4.0 | 3.4 | 1.8 | −69% |
| ECBC | 8.3 | 6.5 | 4.9 | 6.7 | −18% |
| NSRDEC | 2.9 | .9 | 1.8 | 2.2 | −25% |
| TARDEC | 3.9 | 2.7 | 2.4 | 3.3 | −16% |
| Total | 42.8 | 28.7 | 26.8 | 17.1 | −60% |
| Army BA 6.6 | 1.3B | 1.2B | 1.3B | 1.2B | −12% |
| Army RDT&E | 7.1B | 6.7B | 7.9B | 8.1B | 13% |

SOURCES: RDECOM query of PROBE database for PE 0605801A, "Programwide Activities." Army-wide numbers from President's Budgets.
NOTES: AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

RDECOM was unable to verify that the cuts led to increases in indirect cost recoveries. At first glance, the magnitude of these reductions, totaling about $25 million between FY 2014 and FY 2017, seems consistent with RDECOM's explanation they raised indirect rates to compensate for the cuts. However, a closer inspection of the data reveals RDECOM's BA 6.6 appropriations were nearly flat between FY 2015 and FY 2016 when indirect recoveries increased most

[1] The study team discussed these cuts with a variety of stakeholders. One stakeholder with knowledge of these budgeting decisions believes that AMC offered these cuts as part of their contribution to mandatory budget cuts during this period. We could not confirm that this was the case.

severely. The fundamental roadblock to verification is that RDECOM does not track costs at a level of detail that would allow them to show what costs had previously been paid by BA 6.6 funds and shifted to indirect cost recoveries.

## RDECOM Raised Indirect Rates to Compensate for Cuts in Services Provided for "Free" by Third-Party Providers

RDECOM's second explanation for the increases in indirect costs was that third-party providers were cutting back on the "free" services they provided to RDECOM and increased the amount of reimbursement they required from RDECOM. Because these services are funded out of indirect cost pools, RDECOM believes they contributed to the increases in RDECOM's indirect costs.

RDECOM was unable to provide a comprehensive measurement of how costs from third-party providers increased over time. After surveying management across RDECOM, they identified what they believed to be the three primary drivers of these increases. First, bills for software licenses, which were previously paid centrally by the Army, have shifted to RDECOM. RDECOM provided an example of how a number of these licenses increased indirect costs by $6.4 million between FY 2016 and FY 2017 and how RDECOM was anticipating spending about $25 million from indirect costs to fund its migration to Windows 10. Second, IMCOM cut back on the services it provides as part of its common level of service. RDECOM adjusted by accepting a lower level of service (e.g., less frequent mowing of lawns outside buildings) but in other cases is now reimbursing IMCOM using indirect recoveries to pay to maintain levels of service previously provided by IMCOM for free. Third, Army Contracting Command (ACC) reduced its contracting support, causing organizations to increase reimbursement to maintain levels of service. RDECOM cited an example where CERDEC increased payments to ACC by about $4 million.

Again, these cuts from third-party providers are consistent with RDECOM's net zero explanation, but RDECOM is unable to measure the impact of the cuts because it does not track costs at a level of detail necessary to show how costs generated by these cost transfers are impacting RDECOM's indirect collections. RDECOM may be able to quantify these cost increases in the future if they started tracking budgeting and execution at a higher level of detail—for example, a WBS entry for bills from each provider.

## To Implement the AMC CONOPS, RDECOM Is Shifting Costs from Direct to Indirect

RDECOM's third explanation for increases in indirect costs was that as its labs implemented the AMC CONOPS, they shifted direct costs into indirect cost pools.

Following the study team's visit to TARDEC, RDECOM provided detailed cost pool data for FY 2016 and FY 2017 at TARDEC. In FY 2017, TARDEC piloted the AMC CONOPS in its system engineering directorate. Therefore, the changes in the systems engineering directorate provided a useful case study of how implementation of the CONOPS affected indirect costs.

Table D.3 shows how the addition of a third tier of indirect cost pools within TARDEC's System Engineering Directorate changed indirect rates. In FY 2016, TARDEC had a Tier 1 rate that applied across all of TARDEC and a Tier 2 rate that applied to each directorate; thus customers of the Systems Engineering Directorate were charged a flat rate regardless of which personnel in the directorate they used. In FY 2017, the Systems Engineering Directorate implemented six different Tier 3 rates that applied to individual branches; consequently customers were charged multiple indirect rates that depended on which branch's personnel worked on their project (e.g., a charge of $51.11 per DLH for Analytics Branch personnel is charged to a customer to pay for indirect costs in addition to the direct labor costs for each person).

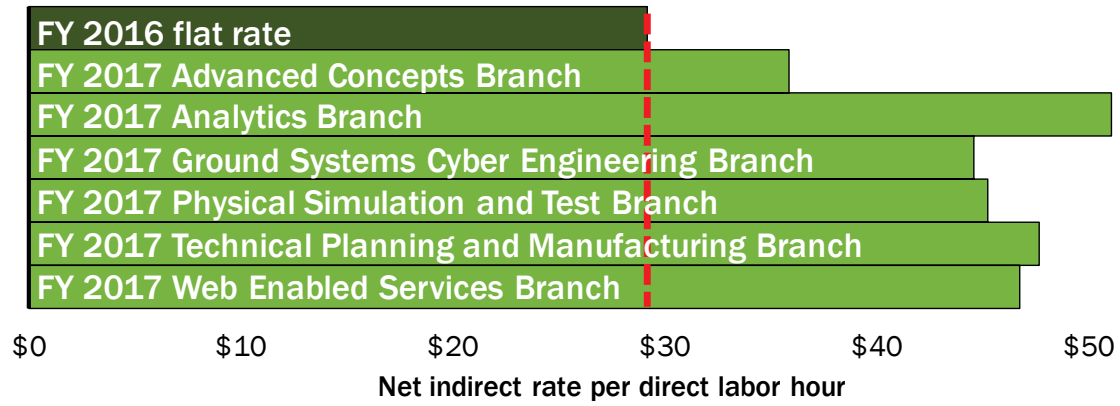
**Table D.3. Changes in Indirect Rate Structure and Rates at TARDEC, FY 2016 to FY 2017 ($ per DLH)**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tier 1 | Name | Corporate | | | | | | | | | |
| | FY 2016 | 17.40 | | | | | | | | | |
| | FY 2017 | 17.97 | | | | | | | | | |
| Tier 2 | Name | Matrix | CSI | GSES | RTI | SE | | | | | |
| | FY 2016 | 3.81 | 34.80 | 10.20 | 10.20 | 11.70 | | | | | |
| | FY 2017 | 4.24 | 34.80 | 13.01 | 12.99 | 0.55 | | | | | |
| Tier 3 | Name | | | | | ACT | ANYT | Cyber | PST | TPM | WE |
| | FY 2017 | | | | | 17.35 | 32.59 | 13.09 | 26.74 | 29.16 | 28.24 |
| Net | FY 2016 | 21.25 | 52.24 | 27.60 | 27.61 | 29.17 | | | | | |
| | FY 2017 | 22.21 | 52.77 | 30.98 | 30.96 | 35.87 | 51.11 | 31.61[a] | 45.26 | 47.68 | 46.76 |

NOTES:
[a] Cyber is also assessed RTI Tier 2, so FY 2017 = $44.60.
CSI = Center for Systems Integration Directorate; GSES= Ground Systems Engineering Support Directorate; RTI = Research & Technology Integration Directorate; SE = Systems Engineering Directorate; ACT = Advanced Concepts Branch; ANYT = Analytics Branch; Cyber = Ground Systems Cyber Engineering Branch; PST = Physical Simulation and Test Branch; TPM = Technical Planning and Management Branch; WES = Web Enabled Services Branch.

Figure D.1 summarizes how net indirect rates changed between FY 2016 and FY 2017 in TARDEC's Systems Engineering Directorate.

**Figure D.1. Indirect Rates in TARDEC's Systems Engineering Directorate, FY 2016 to FY 2017**




Overall rates increased across all branches. RDECOM identified two reasons for these increases.

First, the Tier 3 cost pools provided a tool to more easily and transparently manage costs previously allocated as direct costs to a subset of Systems Engineering Directorate customers. RDECOM personnel had experience in other labs where software costs had been allocated directly to customers who benefited from the software but were shifted to a Tier 3 indirect cost pool when Tier 3 was implemented as it was easier to manage and more transparent to customers and management. RDECOM could not measure the magnitude of this shift but believed the reason the indirect rate in the Analytics Branch was so high was that its cost pool now includes expensive software previously charged directly to projects.

Second, to conform with the AMC CONOPS, TARDEC reclassified formerly direct costs as indirect costs. Most notably, RDECOM found that prior to the implementation of the CONOPS, the TARDEC Systems Engineering Directorate was charging hours spent on supervisory time and division management directly to RDT&E funding but moved these costs to indirect cost pools in FY 2017 to conform to the CONOPS. RAND Arroyo Center finds this shift in costs resulted in a more appropriate allocation of indirect costs because supervisory and management costs benefit all efforts throughout an organization and hence cannot be equitably charged as direct costs.

RDECOM does not measure indirect costs at a level of detail sufficient to validate RDECOM's net zero explanation. However, RDECOM provided RAND Arroyo Center with budget and execution data to help explain the changes between FY 2016 and FY 2017. Table D.4 shows how indirect budgets in TARDEC's Systems Engineering Directorate changed. Budgets for civilian labor and benefits increased the most from about $0.2 million to $4.2 million as supervisory and management time was added to the indirect cost pools. Equipment also increased substantially from about $0.8 million to $3.7 million but in FY 2017 also included IT support and maintenance costs, which were about $2.4 million in FY 2016.

**Table D.4. Indirect Budgets in TARDEC's System Engineering Branch, FY 2016 to FY 2017 ($Thousands)**

| | FY 2016 Total | FY 2017 Total | FY 2017 Indirect Cost Pool Breakouts | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | SE | ACT | ANYT | CYBER | PST | TPM | WES |
| Civilian labor & benefits | 198 | 4,200 | 18 | 512 | 1,013 | 38 | 1,014 | 866 | 739 |
| Contracted labor | 175 | 203 | 100 | 0 | 0 | 0 | 0 | 103 | 0 |
| Travel | 110 | 170 | 10 | 20 | 50 | 40 | 20 | 20 | 10 |
| Supplies | 65 | 110 | 5 | 23 | 10 | 43 | 10 | 10 | 10 |
| Equipment | 798 | 3,745 | 2 | 70 | 1,947 | 172 | 871 | 425 | 258 |
| Training | 20 | 59 | 0 | 0 | 0 | 56 | 0 | 3 | 0 |
| IT support/ maintenance | 2,440 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rent, communication, and utilities | 42 | 36 | 36 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 59 | 0 | 0 | 0 | 0 | 59 | 0 | 0 |
| **Total** | **3,849** | **8,581** | **171** | **625** | **3,020** | **348** | **1,973** | **1,426** | **1,018** |

SOURCE: RDECOM Cost Pool workbooks, FY 2016 to FY 2017.
NOTES: SE = Systems Engineering Directorate; ACT = Advanced Concepts Branch; ANYT = Analytics Branch; Cyber = Ground Systems Cyber Engineering Branch; PST = Physical Simulation and Test Branch; TPM = Technical Planning and Management Branch; WES = Web Enabled Services Branch.

RDECOM provided additional data on funding sources and labor hours for the TARDEC Analytics Branch, which had the biggest increase in net indirect rates. Table D.5 summarizes these funds and hours and is useful for evaluating the net zero explanation—at least for a single branch within RDECOM. In FY 2016, only 756 hours of labor were charged indirectly. Indirect labor increased to over 20,000 hours as management and supervisory time became an indirect cost. At the same time, hours charged directly to RDT&E funds dropped by almost 30,000 hours.[2] These data are consistent with RDECOM's explanation that the reclassification of direct to indirect costs was a major driver of increased indirect costs. The data are also consistent with TARDEC's explanation of the shift of software costs from direct to Tier 3 indirect. Nonlabor direct costs to RDT&E funds fell by over $1.7 million in FY 2017. According the indirect budgets developed in FIRE, $1.6 million was budgeted for software licenses in the Analytics Branch Tier 3 cost pool.

[2] Note that the lack of granularity in the data does not permit a comparison of supervisory and management hours from one year to the next. As an example, it is possible that the branch spent about 30,000 hours on these activities in FY 2016 but dropped to 20,000 hours in FY 2017. It is also possible that the branch spent about 15,000 hours on these activities in FY 2016 and increased to 20,000 hours in FY 2017 while hours truly spent working on RDT&E activities decreased by 15,000 hours.

**Table D.5. TARDEC Analytics Branch, FY 2016 to FY 2017 Funding and Cost Comparison ($Thousands)**

| | Direct Labor | | Direct Labor Hours | | Direct Nonlabor | | Indirect Collections | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | FY 2016 | FY 2017 | FY 2016 | FY 2017 | FY 2016 | FY 2017 | FY 2016 | FY 2017 | FY 2016 | FY 2017 |
| Sec. 219 | 37 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 42 |
| Indirect | 68 | 2,037 | 1 | 20 | 1,895 | 1,943 | 0 | 0 | 1,963 | 3,980 |
| OMA | 50 | 0 | 0 | 0 | 1 | 0 | 9 | 0 | 60 | 0 |
| RDT&E | 4,924 | 2,845 | 62 | 33 | 2,162 | 437 | 1,576 | 1,710 | 8,663 | 4,992 |
| Reimb. | 3,706 | 4,294 | 46 | 52 | 496 | 606 | 1,255 | 2,825 | 5,457 | 7,725 |
| **Total** | **8,786** | **9,218** | **109** | **106** | **4,554** | **2,987** | **2,841** | **4,535** | **16,180** | **16,739** |

SOURCE: RAND Arroyo Center analysis of RDECOM TARDEC Analytics Branch data.
NOTES: OMA = Operations and Maintenance, Army; RDT&E = Research, Development, Test, and Evaluation.

The overall impact of these changes was a nearly 60-percent increase in indirect costs in the TARDEC Analytics Branch (as shown in Table D.3 and Figure D.1). Most of this increase fell on the branch's reimbursable customers because reimbursable hours increased while RDT&E hours fell or were shifted to indirect hours.

## Conclusion: Net Zero Explanation Is Plausible, but Improvements to Tracking Indirect Costs Would Help RDECOM Better Manage Indirect Costs

RDECOM's assertion that their increases in indirect costs were driven by costs transferring into indirect cost pools is plausible. The evidence RDECOM supplied is consistent with the explanation. However, there is no way to measure how much of the increase is due to the three factors discussed above and how much is due to other changes in cost, such as reduced efficiency. Thus, it is not possible for RAND Arroyo Center to conclude whether costs to the Army stayed constant despite increases in RDECOM's indirect costs.

Given all the changes in accounting at RDECOM, proving the net zero explanation is especially challenging. As RDECOM improves their practices by implementing the CONOPS, it should become easier to conduct this type of analysis. However, unless RDECOM starts budgeting and tracking execution of costs at a higher level of granularity (see Improvement #9 in Table 6.1) it will never be possible to develop a detailed understanding of changes in cost. Budgeting and tracking costs at a detailed level allow a more precise analysis of where costs have changed. The analysis of the Analytics Branch, for example, was labor intensive for RDECOM and would be difficult to conduct across the entire command. Even with the effort devoted to that analysis, there remain uncertainties (e.g., to what ends are indirect hours spent?) that can only be remedied by more precision in tracking costs.

# Appendix E. Overview of Previous Studies and Efforts Within DoD

This appendix reviews research that examined the impacts of funding models for DoD service provider organizations, focusing in particular on WCF models and funding of DoD test capabilities. Interest in alternative funding models peaked in the late 1990s as Congress considered expanding WCF models to intramural RDT&E facilities. These proposals were never enacted. However, in the early 2000s concerns about inadequate funding for T&E facilities grew, resulting in the FY 2003 NDAA law standardizing funding across MRTFBs by decreasing reliance on customer funding.

## Prior Studies on Internal Funding Models

Prior RAND work looked extensively at full cost recovery pricing within DoD working capital funds. This work cast doubt on the effectiveness of full cost recovery policies versus marginal cost pricing, which charges internal customers only for the increases in variable costs commands incur on behalf of those customers.

These RAND studies show full cost recovery pricing, when implemented poorly—as has been true for DoD in a number of cases—can create perverse incentives. As noted in Camm and Shulman[1] in their analysis of Air Force pricing for depot-level reparables, working capital funding approaches generally require full cost recovery, with a principal goal being "to generate information about costs and to publish it in the form of prices that can be used by local decisionmakers." If these prices are calculated properly, they incorporate information about costs elsewhere in DoD, enabling options to be chosen that are cost-effective for DoD as a whole while meeting the department's overall goals. Full cost recovery generally requires developing methods for recovering indirect costs in the prices charged for services. But, as Camm and Shulman note: "Covering overhead costs is not the same as providing local decisionmakers with the information they need to promote the Air Force's interests: useful information for accountants is close to irrelevant to local decisionmakers." They also note: "the presence of any surcharge to cover fixed [i.e., indirect] costs inherently reduces the information value of such prices to local decisionmakers." RAND found similar problems with pricing for services provided by the Defense Finance and Accounting Service (DFAS)[2] and AWCF price and credit policies.[3]

[1] See Camm and Shulman, 1993, pp. 8, 9, 10.

[2] Keating and Gates, 1999; Keating et al., 2001; Keating et al., 2003; Keating et al., 2015.

[3] Pint et al., 2002.

Overall, RAND's work indicates the following when determining internal transfer prices for services such as in the DoD's use of working capital funding:

- "To be effective, internal transfer pricing must focus on specific services exchanged."
- "The services exchanged within a large, dynamic organization change repeatedly, requiring flexibility for internal units to negotiate with one another over the forms of transfer and their associated prices."
- "Flexibility is important in a transition [i.e., to working capital funding], but the need for flexibility will persist over the long run."[4]

Whether associated with testing services or other research and development activities, these findings indicate that for any working-capital-funding approach to avoid creating perverse incentives, prices must be set carefully to represent the true marginal cost of providing services. Those prices, for example, should not be averages over provision of more complex and costly services and less complex cheaper-to-provide services, because doing so provides a disincentive for customers seeking the less complex services and subsidizes customers seeking more complex services.

In contrast to DoD depots, which charge fixed prices for many common types of repairs regardless of actual complexity, the NWCF's RDT&E activities calculate their prices to customers based on actual labor hours and actual nonlabor costs. Hours are priced based on pay band averages,[5] like the Army's GFEBS "faces-to-spaces" system currently used by RDECOM and ATEC. Although this introduces some incentives to "game" the system (e.g., requesting personnel who are relatively expensive compared with the band average), it results in prices that are closer to marginal cost and avoids some of the fixed pricing dysfunctions at the DoD depots discussed in the RAND research. Therefore, we recommend that if RDECOM and/or ATEC adopt the WCF alternative, they continue to price based on labor hours and actual, nonlabor costs.

Another implication of these studies is prices should not include charges for indirect and other costs that are truly fixed and change little, if any at all, when demand for services rises or falls. When fixed costs are included in internal prices, the prices do not reflect the true cost to the Army or to DoD as a whole to provide the service and will likely inhibit rather than encourage cost-effective choices. A common example of such dysfunction is the "death spiral" that results in WCF organizations' losing revenue and customers.[6] In a death spiral, revenue falls and indirect assessments to pay for fixed costs must be spread over less workload, thereby increasing

[4] Camm and Shulman, 1993.

[5] The price paid for each labor hour is based on the average labor cost of a pay band across a set of cost centers. For example, the Naval Air Warfare Center, Weapons Division calculates several different pay bands across different competencies and locations. The price customers pay for a GS-14 employee, for example, is the average labor cost per hour for all GS-14 personnel.

[6] See Keating, 2001.

customer costs. WCF pricing exacerbates this problem by making customers pay for previous years' losses. Higher prices lead to less demand, and the spiral continues. It would be in the interests of the Army and the WCF activity to offer flexible pricing and accept any work from customers who will pay at least the marginal cost of that work, but WCF full cost pricing rules do not allow this flexibility.

However, one caveat to marginal-cost pricing is that decisions to invest in or divest of capabilities must be carefully evaluated because customers do not bear the incremental costs of expanding capacity when demand exceeds supply or maintaining capabilities when demand falls. For example, MRTFB pricing rules—discussed in greater detail in the next section—create such inflexibilities. As discussed in Use Case #5 of Appendix K, MRTFB capabilities cannot charge institutional costs to customers. In the use case example, investments in White Sands FBR would reduce risk and benefit a customer base that is largely outside the Army. However, White Sands cannot charge customers for investments—and can charge reactor users for only a fraction of the total operating costs since the reactor's high security costs are indirect costs. This pricing inflexibility discourages the Army, who must foot the bill for many of these institutional costs, from making investment decisions that are optimal for the rest of the national security community.

Between 1998 and 2006, the Navy moved their four shipyards from the NWCF to a combination of direct appropriations and reimbursables termed "mission funding." The Navy's shift away from the NWCF provided opportunities to compare funding mechanisms.[7] Under the new funding model, the shipyards are owned by the fleets who fund the shipyards with operations and maintenance (O&M) funding through direct appropriations. The Naval Sea Systems Command (NAVSEA), who owned the shipyards when they were funded through the NWCF, still provides ship construction and conversion (SCN) funding to the shipyards on a reimbursable basis and pays for direct costs only.

The Congressional Budget Office (CBO) (CBO, 2007) compared the NWCF to the "mission funding" alternative across several dimensions. The CBO found that mission funding resulted in significantly less **cost visibility** than the NWCF but only because the NWCF required detailed reports on costs. The CBO concluded that the same level of cost visibility would be possible under mission funding if it was required by the Navy, DoD, or Congress. The Navy claimed that insourcing the fleets' shipyard work would increase its **operational flexibility** by allowing the shipyards to reallocate personnel without going through the process of obligating and ordering work from the NWCF. For example, shipyard schedules may be juggled at the last minute to account for accidents or unplanned deployments. The CBO found this additional flexibility was only a minor advantage since most work was planned long in advance and WCF rules allow emergency work to begin without funding. The CBO did not find any indication that either

[7] See Cain (2006) and Congressional Budget Office (2007).

funding mechanism was superior at various measures of **operational performance**. The CBO had difficulty calculating comparable measures for mission funding and the NWCF. For example, the NWCF included costs the shipyards no longer pay. The CBO also did not find any differences in capital replenishment levels, although O&M funding for shipyards cannot pay for capital replenishment under mission funding and the fleets must now compete for procurement funding. The CBO analyzed **incentives for shipyards' customers and managers**. Similar to the RAND research cited above, the CBO recognized that NWCF pricing tends to make customers pay for fixed costs above marginal costs, which results in an underutilization of capacity, while mission funding (a combination of appropriations for shipyards and reimbursable direct costs only for NAVSEA) tends to charge customers less than marginal cost, which results in an overutilization. The CBO also noted that the combination of appropriations from the fleets and reimbursable funds from NAVSEA can result in the shipyards' prioritizing customers differently. The CBO also found that switching to mission funding led to an absence of detailed cost accounting; underpricing led to more demand for work than supply, whereas the NWCF forced suppliers to understand and manage costs to keep customers coming through the door. The CBO found that competition played little role in limiting NWCF prices because of limited providers and the fact that customers' choice of a shipyard is determined largely by location.

Cain emphasized that the effort was not merely a transition to a different funding mechanism but rather a consolidation of organizations as the fleets took ownership of the shipyards. His analysis found that the benefits for the reorganization dominated. First, the NWCF made it difficult for mission-funded maintenance activities to borrow labor from the shipyards because NWCF prices were so high. Now that all maintenance is funded through appropriations, shifting labor became simpler. Second, utilization of the workforce increased under mission funding. Cain cites "administrative burdens [and] financial accounting considerations" of the NWCF for slowing down the ability to redeploy NWCF personnel[8] as well as the dysfunctional incentives caused by pricing above marginal cost that result in underutilized capacity. Third, Cain says the consolidation has made the shipyards more responsive to fleet commanders and their shifting priorities, whereas under the NWCF the shipyards responded to individual customers, particularly within support activities (i.e., NAVSEA). Cain believes that many of the commonly cited advantages of the NWCF are relatively small. For example, shipyards have maintained the flexibility of their workforces by funding a pool of workers who can be reassigned across the shipyard as needed. Due to a lack of competition, NWCF was not incentivized to reduce costs. Cain acknowledges that the shift to mission funding reduced visibility of costs outside the shipyard, but he contends that the shipyard commander still has access to the information needed to manage effectively.

[8] Cain, 2006, p. 46.

The U.S. Naval Research Advisory Committee examined the NWCF model for funding the Navy labs. They note that major advantages of the NWCF are that it "incentivizes the [labs] to be relevant and responsive to the needs of their primary customers" and it "allows the Navy to be responsive to joint needs because the WCF provides a mechanism for [labs] to expand their business base" which "reduc[es] overhead rates to all customers."[9] However, they note several drawbacks of the NWCF model. First, it does not incentivize warfare centers to work on S&T problems; thus most S&T funding flows into Navy research laboratories while many warfare centers receive nearly no S&T funding. Second, the NWCF coupled with the lack of S&T funding causes the warfare centers to focus on near-term problems and to ignore the longer-term future, judging them to be a "serious risk . . . in a world where both technology and operations are evolving rapidly"[10] and contributing to "a slow 'death spiral' of diminishing technical competence" in the warfare centers.[11]

The Defense Science Board compared the funding models used at laboratories across the Army, Navy, and Air Force. They concluded, "Applying the WCF model across the entire lab portfolio, for example, is not consistent with multi-year scientific processes, which require stability and long-term planning."[12] They also recommended "the Labs need a mix of core mission funding and work for others" and recommended that Navy labs, currently funded through the NWCF, be provided with appropriations through a "base mission fund" to fund its core mission.[13]

In the past, Congress has considered requiring intramural RDT&E organizations to use the WCF. For example, the Senate's proposed version of the FY 2000 NDAA "would require the use of working capital funds for financing in research, development, test and evaluation, to ensure that the department's science and technology program is carried out in a cost-effective manner."[14] This provision was removed from the enacted FY 2000 NDAA, but the conference report required DoD to study the transition:

> The conferees direct the Department of Defense to evaluate the potential for financing research, development, test and evaluation facilities through a working-capital fund financing mechanism and provide a report to the Committees on Armed Services of the Senate and the House of Representatives not later than September 30, 2000. This report shall include a detailed discussion of: the current method of financing research, development, test and evaluation facilities of the

[9] U.S. Naval Research Advisory Committee, 2010, p. 6.

[10] U.S. Naval Research Advisory Committee, 2010, p. 7.

[11] U.S. Naval Research Advisory Committee, 2010, p. 39.

[12] Defense Science Board, 2017, p. 18.

[13] Defense Science Board, 2017, p. 19.

[14] U.S. Senate Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2000 Report [to accompany s. 1059]*, Washington, D.C.: Government Printing Office, 106–50, May 17, 1999.

> military services; a complete transition to working-capital fund financing for these facilities; and a mix of direct appropriations and working-capital fund financing for these facilities. Additional areas for discussion will include actions necessary to ensure a seamless transition to working-capital fund financing, the benefits and additional costs associated with the full cost recovery under working-capital fund financing, and methods to ensure that customer accounts are sufficiently funded to support full cost recovery under working-capital fund financing.[15]

The eventual report recommended that all RDT&E facilities be transitioned to working capital funds.[16] One of the primary benefits the report identified was that adopting a WCF would standardize financial processing across DoD RDT&E facilities, which would result in comparable prices to all customers and would improve the visibility and comparability of program costs across DoD. In addition, they found that WCF activities are more adaptable to customer needs and that customer-supplier relationships provide incentives for effectiveness and efficiency. The authors estimated that one-time transition costs would be less than $100 million, but after the transition, the WCF would cost the same as current models. A major shortcoming of the analysis is that the author's analysis assumed that "the activities are in a competitive environment that encourages efficient practices" while at the same time acknowledging several cases where a competitive environment does not exist, such as with unique MRTFB capabilities and S&T funding that is largely directed at the service labs.

The only subsequent mention of this proposal in congressional reports came in a House report the next year, which indicated attention was focusing away from moving toward a full cost recovery WCF model toward concerns that the DoD was not funding test and evaluation capabilities sufficiently:

> The committee is disturbed by the Department's inability to ensure sufficient funds necessary to sustain T&E; facilities, as well as the many worthy test facility upgrades identified by the services. The committee is aware that the Department is conducting an assessment of various funding methods, to include consideration of working capital funding and other T&E customer cost-sharing alternatives in order to ensure adequate sustainment funding for T&E facilities. The committee expresses strong congressional interest in this issue and directs the Secretary of Defense to report any recommended change to current funding procedures for these facilities prior to including them in future budget requests.[17]

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[15] U.S. House of Representatives, *National Defense Authorization Act for Fiscal Year 2000 Conference Report [to accompany s. 1059]*, Washington, D.C.: Government Printing Office, 106–301, August 6, 1999.

[16] U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *Report on the Evaluation of the Potential for Financing DoD Research Development Test and Evaluation Facilities Through a Working Capital Fund Financial System*, Washington, D.C.: DoD OUSD(C), 2000.

[17] U.S. House of Representatives, *Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 Report of the Committee on Armed Services House of Representatives on H.R. 4205 together with Additional Views*, Washington, D.C.: Government Printing Office, 106–616, May 12, 2000.

In response to these concerns, the report acknowledged that WCF might discourage sustainment of these capabilities and recommended that the WCF be augmented by appropriations to maintain the capabilities (an option precluded by the FY 2003 NDAA, which will be discussed in the next section).[18] However, the authors believe that, because many of these are unique capabilities that programs require for testing, they could be capitalized in a WCF "with minimal disruption."

Since this time, the DoD and Congress have been especially concerned with how funding models can encourage or discourage testing. Testing is subject to high indirect costs due to high capital costs of equipment and the fact that demand for test facilities can ebb and flow over time, resulting in underutilized capacity. The next section discusses some of these studies as well as congressional concerns that led to pricing rules that require that MRTFB users pay—at most—for the direct costs of testing.

## Evolution of MRTFB Funding Policies

Concern about variation in funding practices at test ranges existed as early as the 1970s. For example, the Bergquist study[19] found large variations in funding policies across DoD test facilities.[20] Despite the variations, all facilities required at least some degree of direct funding for user costs. The study recommended all test facilities adopt a common funding policy that charged users for all direct costs and no indirect costs—the same policy eventually adopted by the FY 2003 NDAA. The study considered other alternatives that would charge users for a share of indirect costs but notably did not consider in-depth any alternative that shifted to full institutional funding or full cost recovery from users. The study concluded a balance was needed because user funding aided flexibility and responsiveness, but full user funding would discourage testing and improperly charge users for underutilized capacity.

Section 913 of the FY 2000 NDAA (Public Law 106–65) required the Defense Science Board to "conduct an analysis of the resources and capabilities of all the laboratories and test and evaluation facilities of the Department of Defense." The NDAA required the analysis to "identify opportunities to achieve efficiency and reduce duplication of efforts." The resulting DSB report recommended shifting away from or eliminating customer funding while standardizing financial

[18] U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), 2000.

[19] George W. Bergquist, Henry D. McGlade, John D. Alexander, Clifford T. Everett, and John W. Cooley, *Report on Study of Funding Policy at Major Test and Evaluation Support Activities*, Washington, D.C.: Assistant Secretary of Defense (Comptroller), 1972.

[20] The Army had a particularly high degree of variability. White Sands Missile Range institutionally funded 99 percent of costs (although a separate testing organization located at White Sands, the Army Missile Test Evaluation Directorate, charged users for direct costs and a limited set of users—customers who were not funded by Army RDT&E—for indirect costs). Dugway Proving Ground (94 percent) and Electronics Proving Ground (85 percent) also funded most costs through institutional funding. In contrast, the Aberdeen Proving Ground (4 percent institutionally funded) and the Yuma Proving Ground (20 percent) recovered most costs from customers.

management practices. These recommendations were a key driver of legislation enacted in the FY 2003 NDAA,[21] which limited costs that could be paid by customers at MRTFBs and standardized financial practices across the DoD.

The Senate version of the FY 2003 NDAA (S.2514) contained language that would have implemented many of the recommendations in the December 2000 DSB report. The report (107–151) accompanying S.2514 observes the following:

> The committee believes that the Department of Defense has no greater duty than to ensure that the weapons systems that it puts in the hands of our soldiers, sailors, airmen and marines will operate as intended in combat situations. Adequate testing of weapons systems is not an abstract concept: lives depend upon it.[22]

Consequently, Section 231 of S.2514 would have established a DoD T&E Resource Enterprise reporting to the Director of Operational Test and Evaluation (DOT&E) that would "implement the [DSB] task force recommendation."[23] Section 232 of S.2514 would have transferred "testing funds from the research and development programs of the military departments and defense agencies to the major test and evaluation investment accounts of the Department of Defense."[24]

S.2514 would have also transferred 0.625 percent of the budgets of the military departments and defense agencies for demonstration and validation, engineering and manufacturing development, and operational systems development to the DoD T&E Resource Enterprise (about $254 million in total). This provision was included to address the following problems noted in the FY 2001 DOT&E annual report and included verbatim in the Committee Report:

> At the present time, defense programs must bear both the cost of their tests and the overhead costs to maintain the ranges. This has proven to be a disincentive to testing. The cost to program managers has risen sharply over the past decade as they take on the overhead costs of the test ranges; as a result, program managers seek to minimize the amount (and therefore the cost) of testing. As they succeed, their success forces the price even higher for each test. A recent analysis shows that about $2.4 billion in test costs (previously funded in the MRTFB institutional budgets) have been shifted to the users since FY90. Eighty-five percent of the shift occurred during the last five years. As institutional funds have fallen, the test ranges and centers have sought to recover more costs from users. The users, in turn, have reduced testing and accepted additional risk to remain

[21] Discussion of the unreleased report's conclusions and its impact on the legislation is included in U.S. Senate Subcommittee on Emerging Threats and Capabilities of the Committee on Armed Services, *Improved Management of Department of Defense Test and Evaluation Facilities*, Washington, D.C.: Government Printing Office, Senate Hearing 107–650, May 21, 2002.

[22] U.S. Senate Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2003 Report [to accompany s. 2514]*, Washington, D.C.: Government Printing Office, 107–151, May 15, 2002.

[23] U.S. Senate Committee on Armed Services, 2002.

[24] U.S. Senate Committee on Armed Services, 2002.

> within their budgets. Test adequacy has suffered as a consequence. In FY01, the MRTFB charged an estimated $250 million per year more to users than was charged to them prior to FY90. Effectively, this means that, although users in FY01 collectively paid the same amount as in FY90, they were doing less testing.[25]

S.2514 also included a provision requiring

> that users of the MRTFB are charged only for the direct costs of testing and are no longer required to pay for overhead costs. The committee anticipated the research and development programs of the department should recover a significant portion of the funds transferred to the MRTFB investment accounts through lower overhead rates charged for testing at MRTFB facilities. However, any shortfall of funding resulting from this transfer should not be taken directly from testing budgets of the programs and shall not be used as a basis for reducing testing requirements for any system. On the contrary, the committee believes the lower rates charged for testing at MRTFB facilities should lead to increased testing of Department of Defense systems.[26]

As noted in the conference report (107–772) on the final FY 2003 NDAA (H.R. 4546),[27] the House version of the bill contained no provisions regarding management and funding of DoD T&E facilities similar to those in S.2514. In an apparent compromise, Section 231 of the final bill established the TRMC which would be "responsible for developing a strategic plan for DoD test and evaluation resources; reviewing and certifying the adequacy of proposed DoD budgets for test and evaluation activities; and administering the CTEIP and the DoD program for test and evaluation science and technology."[28]

The final funding rules, contained in Section 232, "Objective for Institutional Funding of Test and Evaluation Facilities," of the FY 2003 NDAA, require "the institutional and overhead costs of a facility or resource of a military department or Defense Agency that is within the MRTFB are fully funded through the major test and evaluation investment accounts of the military department or Defense Agency, the account of the CTEIP of the Department of Defense, and other appropriate accounts of the military department or Defense Agency." The FY 2003 NDAA also requires "the charge to an element of the Department of Defense for a use by that element of such a facility or resource for testing under a particular program is not more than the

[25] U.S. Senate Committee on Armed Services, 2002.

[26] U.S. Senate Committee on Armed Services, 2002.

[27] U.S. House of Representatives, *National Defense Authorization Act for Fiscal Year 2003 Conference Report to accompany H.R. 4546*, Washington, D.C.: Government Printing Office, 107–772, November 12, 2002.

[28] U.S. House of Representatives, 2002.

amount equal to the direct costs of such use by that element."[29] These prescriptions remain in effect and are reflected in DoD's Financial Management Regulation (DoD FMR 7000.14-R).[30]

Therefore, the concern that full cost recovery charging, such as would exist under full implementation of working capital funding for those capabilities, was reinforcing strong preexisting incentives against robust testing of DoD weapon systems drove the creation of funding and charging policies for MRTFB capabilities that have been in existence for more than a decade. In particular, full cost recovery charging was resulting in escalating rates charged to weapon programs that caused them to reduce testing, leading then to lesser utilization of test facilities and still further increases in rates charged to a smaller customer base.

Substantial changes to those policies, including to the provisions of the FY 2003 NDAA and to DoD Instruction (DoDI) 3200.18, "Management and Operation of the Major Range and Test Facility Base (MRTFB)," would be required to implement a working capital funding approach for use of MRTFB capabilities that includes full cost recovery.[31]

[29] The NDAA defines direct costs as those "that are directly attributable to the use of the facility or resource for testing under a particular program, over and above the institutional and overhead costs with respect to the facility or resource."

[30] See U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *Financial Management Regulation*, vol. 1–16, Summary of Major Changes, Washington, D.C.: DoD OUSD(C), DoD 7000.14-R, June 2010.

[31] DoD financial management regulations require defense working capital fund activities within to set their prices based on full cost recovery, including all general and administrative support provided by others. See FMR, vol. 2B (090107A).

# Appendix F. Funding Models Used Across DoD Intramural RDT&E Organizations

In addition to reviewing policies at RDECOM and ATEC, the study team visited and had discussions with other intramural RDT&E organizations in the U.S. Army Corps of Engineers (USACE), the U.S. Air Force (USAF), and the U.S. Navy. The study team did not have the same level of data access or engagement as it did to and with RDECOM or ATEC; however, we were able to develop a detailed appreciation of the funding models used in these organizations. We focused our exploration on laboratories and provision of engineering support personnel (i.e., RDECOM's activities) and test ranges (i.e., ATEC's activities, but we did not look at other services' operational test and evaluation organizations since OTC and AEC were not a focus of this study).

## Funding Models in the U.S. Air Force

In the USAF, all of these internal RDT&E activities are overseen by Air Force Materiel Command (AFMC). Air Force Research Laboratories (AFRL) houses the USAF research laboratories. Unlike RDECOM, AFRL does not provide USAF PEOs with engineers. Instead, the USAF consolidates all PEO support into AFLCMC. USAF test organizations are in the Air Force Test Center (AFTC), which is similar to ATEC.

### *U.S. Air Force Laboratories: Air Force Research Laboratories*

Compared with RDECOM, AFRL is smaller and more focused on S&T research. Civilian labor—including both direct and indirect costs—is mostly paid from BA 6.2 appropriations. Table F.1 summarizes AFRL's budget sources and expenditures. In FY 2016, AFRL had a budget of $2.4 billion, consisting of S&T appropriations. In addition, AFRL managed a similar amount of external funding. However, almost all of this funding is direct cite funding, where AFRL puts customers' funding directly into contracts (e.g., with industry). Most funding managed by AFRL is spent externally—less than 15 percent remains in-house, where it covers both direct and indirect internal costs, including civilian labor. External costs (contracts with academia, small business, and industry) that can be directly linked to a customer are typically funded by that customer through direct cite.

**Table F.1. AFRL Funding Sources and Expenditures, FY 2016 ($Millions)**

| AFRL Funding Sources | | AFRL Expenditures | |
|---|---|---|---|
| **Source** | **FY 2016 Funds** | **Expenditure** | **FY 2016 Funds** |
| S&T | 2,433 | In-house[a] | 748 |
| External | 2,795 | Academia | 425 |
| Reimbursable[b] | 79 | Small business | 1,320 |
| Direct cite[b] | 2,691 | Industry | 2,735 |
| **Total** | **5,228** | **Total** | **5,228** |

SOURCE: "FY 2016 AF S&T Business Model" as of May 31, 2017; slide from AFRL, except for breakdown of external funding.
[a] Internal costs include civilian personnel and other costs AFRL pays directly with its own funding (e.g., travel), excluding contract costs.
[b] Split is based on "AFRL FY 2016 Top 10 External Customers" as of December 7, 2016 slide from AFRL. Due to different source dates, these data have slight inconsistencies across sources.

In discussions, AFRL personnel indicated much of the small amount of reimbursable funding they receive from customers ($79 million) is for foreign military sales (FMS). DoD policy requires FMS customers pay for both direct and indirect costs. Otherwise, AFRL usually charges customers for contract costs through direct cite but does not charge customers for in-house costs, such as the cost of civilian labor.

Table F.2 summarizes USAF (including AFRL) cost practices (AFTC practices are also included in the table but are discussed in the next section). Policies are very simple relative to most of the other organizations studied. AFRL S&T appropriations pay for both direct and indirect costs. With some small exceptions, AFRL customers only pay for external costs and use direct cite to fund those costs.

**Table F.2. USAF General Cost Practices**

| | Category | AFRL Appropriations | AFRL Customers | AFTC |
|---|---|---|---|---|
| | **Sec. 219 tax** | Yes (taxed off the top) | N/A | N/A |
| **Direct costs** | **Civilian labor** | Actual labor/ benefits costs | N/A[a] | Actual labor/ benefits costs |
| | **Mission-specific training: Labor** | | | |
| | **Mission-specific training: Nonlabor** | Actual cost | Direct cite[b] | Actual cost |
| | **CTR labor** | | | |
| | **Nonlabor** | | | |
| **Indirect costs** | **Civilian labor** | Actual labor/benefits costs[c] | | |
| | **General training: Labor** | | | |
| | **General training: Nonlabor** | Actual cost[c] | | |
| | **CTR labor** | | | |
| | **Nonproductive time** | Actual labor/benefits costs[c] | | |
| | **Nonlabor** | Actual cost[c] | | |

SOURCE: Discussions with the commands and policies in U.S. Air Force Materiel Command (2016, AFMC Instruction 65–602).
NOTES:
[a] AFRL has little work that is truly reimbursable. FY 2016: $79.0 million reimbursable vs. $2,690.8 million direct cite.
[b] Customers pay these contract costs with their appropriations using direct cite.
[c] A limited set of external customers pay indirect costs (FMS, commercial, advanced technology development programs).
Red indicates the organization funds with appropriations. Blue indicates reimbursable customers pay.

Table F.3 summarizes USAF labor rate policies. AFRL uses the Job Order Cost Accounting System II (JOCAS II) for its cost accounting. JOCAS II has similar cost banding accounting rules as GFEBS. While GFEBS uses actual benefits paid to allocate costs, AFRL uses a benefit rate provided by OUSD(C). Like ATEC, AFRL uses the standard DoD leave assessment rather than calculating a rate based on hours worked like RDECOM. Overall, there is less of a need for precision in cost accounting because AFRL's appropriations are paying for civilian costs, whereas more precision is necessary to allocate civilian costs to customers.[1]

AFRL does not pay for base support costs or for military personnel. Those costs are paid by the host and the USAF.

[1] Even if AFRL pays for most costs, detailed cost accounting would help AFRL in managing their costs and planning. However, as discussed in Appendix E, CBO (2007) found that moving Navy shipyards out of the NWCF to mission funding resulted in less cost visibility.

**Table F.3. USAF Labor Rate Policies**

| | Category | AFRL Appropriations | AFRL Customers | AFTC |
|---|---|---|---|---|
| Civilian labor rates | Salaries | Hourly rates (average product/ service/ standard rates) | N/A[a] | Hourly rates (average product/ service/ standard rates)[b] |
| | Benefits | OSD civilian personnel fringe benefit rate assessment | | OSD civilian personnel fringe benefit rate assessment |
| | Leave | +18% leave assessment | | +18% leave assessment |
| | Indirect assessment | N/A[c,d] | | |
| CTR labor rates | Contract cost allocation | Actual cost[e]/ direct cite[f] | | |
| | Indirect assessment | N/A[c,d] | | N/A |

SOURCE: Discussions with the commands and policies in U.S. Air Force Materiel Command (2016, AFMC Instruction 65–602).
[a] AFRL has little work that is truly reimbursable.
[b] AFMC Instruction 65–602 also permits fixed prices based on estimated cost.
[c] Exception: FMS and commercial customers must pay an indirect assessment. Non-DoD assessment is optional.
[d] Advanced technology development programs must pay an indirect assessment.
[e] Actual contract cost includes contractor salaries, benefits, leave, G&A, fees, and so on.
[f] Customers pay these contract costs with their appropriations using direct cite.

### *U.S. Air Force Test Ranges: Air Force Test Center*

As with the Army, the USAF placed its MRTFB ranges in a separate command. Whereas ATEC is an independent command, AFTC is subordinate to AFMC. The biggest impact of the USAF model is that AFTC is not technically an independent command; thus, it is not responsible for operational testing and independent evaluation—functions that exist under ATEC in OTC and AEC. Another difference is ATEC manages some test capabilities not designated as MRTFBs (most notably, RTC) while AFTC is entirely within the MRTFB.

AFTC has similar cost accounting policies as ATEC's MRTFBs.

Table F.2 above shows AFTC's customers pay for direct costs of testing while AFTC's appropriations pay for indirect costs. Table F.3 shows that AFTC creates civilian labor rates similarly to AFRL (which, as noted above, is similar to how ATEC creates rates in GFEBS). AFMC policies permit customers to be charged estimated costs of tests rather than actual costs based on time cards, but AFTC personnel told us that they typically bill customers based on hours entered in JOCAS II, and this sometimes results in AFTC returning funding to customers (similar to ATEC).

Like ATEC, AFTC does not charge for military personnel, who are funded through USAF appropriations. Unlike ATEC, AFTC receives appropriations (operation and maintenance) to fund base operating costs.

### *U.S. Air Force Acquisition Support Engineers: Air Force Life Cycle Materiel Command*

Unlike the Army and the Navy, USAF PEOs obtain most of their engineering support in-house. PEOs report to the service acquisition executive (SAE) and are independent of AFMC, under the Assistant Secretary of the Air Force for Acquisition. However, the PEOs obtain most of their acquisition workforce from AFMC.[2] Most USAF PEOs obtain their workforce from AFLCMC.[3] To provide flexibility in staffing, AFLCMC works under a matrix construct. PEO directorates support a specific Air Force PEO but have relatively few personnel assigned. They obtain most of their personnel from the Functional and Execution Support Directorates, which includes an "Engineering" directorate.[4]

Starting in FY 2018, acquisition personnel are fully funded with appropriations split across ten program elements (see Table F.4). Prior to FY 2018, the acquisition workforce was funded using O&M funding. AFLCMC personnel indicated that the BA 6.6 appropriations provide the ability to adapt the workforce to unplanned changes in program priority after budgets have been approved, since $10 million can be reprogrammed easily between the program elements. Nevertheless, funding the acquisition workforce purely using appropriations limits the degree to which the workforce can be flexed. Several of the program elements are over $200 million; hence a $10 million adjustment is only less than 5 percent of the budget. According to AFLCMC personnel, they are examining other methods to make the workforce more adaptable, such as using direct cites to surge the workforce by charging other RDT&E programs that surged personnel are supporting.[5]

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[2] Robert S. Tripp, Kristin F. Lynch, Daniel M. Romano, William Shelton, John A. Ausink, Chelsea Kaihoi Duran, Robert G. DeFeo, David W. George, Raymond E. Conley, Bernard Fox, and Jerry M. Sollinger*, Air Force Materiel Command Reorganization Analysis: Final Report*, Santa Monica, Calif.: RAND Corporation, MG-1219-AF, 2012.

[3] The PEO for Space sources staff from Space and Missile Systems Center under Air Force Space Command.

[4] For an overview of the organization, see Air Force Life Cycle Management Center, *A Revolution in Acquisition and Product Support*, Wright-Patterson Air Force Base, Ohio: AFLCMC, 2013.

[5] This concept is similar to direct charges in the Army. According to the AFLCMC, reporting about personnel to OSD is a key challenge to implementing this concept and, as this report explains, represents a key challenge to direct charge in the Army.

**Table F.4. USAF Acquisition Workforce Funding, FY 2018 President's Budget ($Millions)**

| Program Element | Acquisition Workforce Category | FY 2018 Budget |
|---|---|---|
| 0605826F | Global Power | 220.809 |
| 0605827F | Global Vigilance and Combat Systems | 223.179 |
| 0605828F | Global Reach | 138.556 |
| 0605829F | Cyber, Network, and Business Systems | 221.393 |
| 0605830F | Global Battle Management | 152.577 |
| 0605831F | Capability Integration | 196.561 |
| 0605832F | Advanced Program Technology | 28.322 |
| 0605898F/664127 | Management HQ | 5.510 |
| 0605833F | Nuclear Systems | 126.611 |
| 1206392F | Space and Missile Center Civilian Workforce[a] | 169.887 |

SOURCE: "Acquisition Workforce" PEs in USAF BA 6.6 (Management Support) appropriations are from FY 2018 President's Budget.
[a] The Space and Missile Center Civilian Workforce was funded through these funds prior to FY 2018 and does not include "Acquisition Workforce" in the program element title.

AFLCMC is the only example the study team identified as using a full appropriations model to fund RDT&E personnel. However, all the other organizations we looked at use customer-supplier relationships. AFLCMC has, in effect, insourced personnel so there is no longer a customer-supplier relationship. The study team did not consider organizational changes, so we did not consider an alternative that insources engineering personnel (i.e., moving RDECOM matrixed personnel into PEO organizations).

## Funding Models in the U.S. Navy

The Navy funds its lab activities through the NWCF. The labs receive funding through reimbursables from customers, who receive appropriations. RDECOM, on the other hand, receives a portion of its funding as appropriations that are sent directly to RDECOM—that is, there is no customer in between the appropriations and RDECOM. The Navy labs and RDECOM both recover indirect costs using indirect recoveries recovered by applying indirect rates to direct costs. Since RDECOM receives direct appropriations, it also levies these indirect rates on work funded with appropriations. Although WCF rules create differences (e.g., its rules would disallow RDECOM's BA 6.6 appropriations for indirect costs, and its rules expand the third-party costs a WCF organization may pay), the funding models for RDECOM and NWCF labs are very similar.

Navy MRTFBs are subject to the same policies as other MRTFBs that require the military departments to fund indirect costs using their appropriations and customers to fund direct costs with reimbursable funding. Navy MRTFBs organizationally differ from Army and USAF MRTFBs. Navy MRTFBs are components of some of the Navy's labs, which are otherwise

funded through the NWCF. In our discussions within the Army, we found that this funding arrangement led to confusion about how Navy MRTFBs were funded and led to a false confidence about the ability to move ATECs MRTFBs into a WCF model.

### *Funding Models for U.S. Navy Laboratories*

U.S. Navy labs include the Naval Research Laboratory (NRL), which tends to have a similar focus on S&T activities like ARL, and the warfare centers, which have a similar focus on supporting weapons systems like RDECOM's RDECs. Unlike RDECOM labs, the Navy labs do not possess appropriations for mission work or for the indirect costs of lab work. Instead, their customers' appropriations fund orders to the labs through the NWCF. For example, the Naval Research Office, a major customer of NRL, manages the Navy's S&T (BA 6.1 to 6.3) appropriations. Other RDT&E appropriations are managed by Navy systems commands, who are customers to the warfare centers. As an example, the Naval System Engineering Directorate in NAVSEA receives appropriations, which it then uses to fund orders, especially at Naval Surface Warfare Center (NSWC) labs.

The study team met with labs across the three biggest Navy systems commands. Within the Space and Naval Warfare Systems Command (SPAWAR), we spoke with SPAWAR Systems Center Pacific, and within NAVSEA, we met with NSWC Port Hueneme Division. The team interacted most often with the Naval Air Warfare Center Weapons Division (NAWCWD) within the Naval Air Systems Command (NAVAIR), through meetings and follow-up communications. We focused on NAWCWD because they also manage MRTFB capabilities.[6] The tables below reflect NAWCWD policies. Differences may exist between NAWCWD's business practices and the business practices for other Navy labs funded through the NWCF.

To provide predictability to WCF customers, WCF organizations stabilize prices in advance of the year of execution. Stabilized pricing allows customers to request funding during the budget process and prevents surprises from changing those prices after the customers have set budgets. Because stabilized prices will rarely equal average costs (it is difficult to predict prices with certainty in advance; plus, WCF rules do not require revenues to equal cost), WCF organizations generate a profit or loss each year, which is called the net operating result (NOR). Stabilized prices attempt to equal costs and revenues over the long term, so WCF organizations include in their prices either a surcharge to recover historic losses in the NOR or a subsidy to return historic profits in the NOR to the customers.

Most WCF pricing criticism (see Appendix E) focuses on stabilization of prices, surcharges, and subsidies leading prices to not reflect the marginal costs of operating the WCF. Further, the

[6] NAWCWD manages MRTFB capabilities at China Lake and Point Mugu. Neither NSWC nor SPAWAR manages MRTFB capabilities in any of their labs. The only other Navy MRTFB locations are at Patuxent River (managed by the Naval Air Warfare Center Aircraft Division) and the Atlantic Undersea Test and Evaluation Center (managed by the Naval Undersea Warfare Center).

prices customers pay can potentially be averaged over too broad a set of services, and this incentivizes customers needing high-cost services to bring their business to WCF activities and customers needing low-cost services to look elsewhere.[7] Navy labs mitigate many of these potential problems by stabilizing prices based on the price per DLH. Since the number of hours that lab personnel work can potentially vary from estimates, additional funds are needed from customers, or the scope of work cut, if hours go over estimates, and funds can be returned to customers if hours are under estimates.[8] NWCF personnel charge their hours within the Navy ERP (NERP), which automates the cost accounting and determines amounts to bill customers. Billing rates in NERP can be customized based on the customer—a lab will charge most of its customers stabilized rates but can choose to charge DoD MRTFB customers with actual costs.

DoD rules require WCF-funded activities to provide a high-level transparency through President's Budget exhibits. These presentations are relatively consistent across military departments and provide publicly available insights into cost drivers, costs, prices, and trends over time. Unfortunately, the exhibits can be somewhat misleading regarding stabilized rates, since many DoD personnel who are not familiar with WCF accounting rules assume the average rates published in the exhibits are the prices that customers pay. Rather, the prices in the exhibits are high-level averages that set a cap on prices, while the prices customers pay are considerably more detailed and complex. As an example, in the NWCF President's Budget there is a single stabilized rate published for all of the Naval Air Warfare Center (NAWC) labs. In discussions with NAWCWD, we learned NAWCWD alone has over 100 rates dependent on the salaries and organizational position of personnel. The rate in the President's Budget is a cap on the average rate of all personnel across all NAWC labs.

Table F.5 shows a comparison of average prices and costs at RDECOM and the Navy labs. Because RDECOM sets rates and executes indirect spending to set revenue equal to costs, average costs and prices are the same. In the Navy columns, the "average price" is the average stabilized rate that customers pay while the "average cost" reflects the labs' spending. On average, the differences are fairly small because the costs that are stabilized are relatively consistent and managed year to year.[9] Civilian labor costs are usually very predictable because

[7] For example, a depot could potentially price a vehicle overhaul on a per-vehicle basis. Customers could likely find a better price for overhauling vehicles needing little work while customers needing complicated repairs would receive a better deal from the average pricing.

[8] One lab told us that one of their non-Navy customers will not send additional funding if costs go over budget. In this case, the NWCF allows the lab to use cash from its corpus to finance cost overruns that are recorded as a loss and recovered from future customers.

[9] The biggest difference was at NRL, and an analysis of this difference provides insights into the features of the WCF. Average prices charged were over $4 per labor hour less than average costs in FY 2016. This discrepancy between prices and costs was intentional. The FY 2016 NWCF budget, which set the average price per DLH at $144.04, expected average costs to be $148.80 per DLH, a small difference from costs reported in the FY 2018 NWCF budget. Note that the NWCF does not provide a detailed justification of why the average price was set at $144.04 per DLH.

the civilian workforce stays fairly steady while salaries change predictably. Indirect costs are budgeted in advance and can be adjusted slightly in the year of execution. Personnel at NAWCWD told us one surprise they experienced when personnel at China Lake were moved into the Los Angeles locality pay area—labor costs increased by about 20 percent, but customers did not immediately pay for the higher cost of personnel.[10]

**Table F.5. Average Direct Labor Costs per Direct Labor Hour, FY 2016**

| RDECOM | Avg. Cost/Price | Navy | Avg. Price | Avg. Cost |
|---|---|---|---|---|
| ARL | $141.69 | NRL | $144.04 | $148.64 |
| AMRDEC | $113.57 | NAWC | $104.15 | $102.49 |
| ARDEC | $119.11 | NSWC | $100.21 | $102.82 |
| CERDEC | $111.40 | NUWC | $99.69 | $100.58 |
| ECBC | $131.13 | SSC | $108.29 | $109.70 |
| NSRDEC | $112.60 | | | |
| TARDEC | $115.56 | | | |

SOURCES: RDECOM from RDECOM analysis of labor costs, September 15, 2017; NWCF data from the FY 2018 President's Budget. Avg. price is the stabilized rate from the budget while avg. cost is the unit cost from the budget.
NOTES: Costs and prices include both direct and indirect costs to projects.
ARL = Army Research Laboratories; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center; NRL = Naval Research Laboratory; NAWC = Naval Air Warfare Center; NSWC = Naval Surface Warfare Center; NUWC = Naval Undersea Warfare Center; SSC = Space and Naval Warfare Systems Command (SPAWAR) Systems Center.

Overall, Table F.5 shows that costs to customer are somewhat similar at RDECOM and the Navy. An exact comparison among the organizations cannot be made because there are different costs and different policies. For example, RDECOM receives BA 6.6 appropriations for indirect costs but funds the indirect costs of HQ RDECOM out of OMA appropriations, while Navy labs receive no appropriations for indirect costs and charge customers to pay for headquarters cost. An example of different policies is that RDECOM treats its direct cite contracting costs as an indirect cost while the Navy labs charge direct cite contracting costs to customers as a direct cost loaded with indirect rates; this difference in policies lowers indirect rates in the Navy because indirect costs are lower and spread across a greater number of DLHs.

[10] The locality was changed for FY 2016. According to the FY 2016 President's Budget, the targeted NOR at NAWC was originally $0.4 million. In the FY 2017 budget, the updated NOR was revised to −$34.5 million, and the final FY 2016 NOR was −$34.9 million according to the FY 2018 budget. Overall, average prices increased just over 5 percent from FY 2016 to FY 2017 and was likely driven by the need to recover the FY 2016 NOR and the increased personnel prices at China Lake (but again, the President's Budget does not provide this level of detail or a justification for prices).

**Table F.6. NWCF Laboratory and MRTFB Cost Accounting Policies**

| | Category | NWCF Labs (Except MRTFB) | Navy MRTFB |
|---|---|---|---|
| | **Sec. 219 tax** | 2% included in G&A rate | N/A |
| **Direct costs** | **Civilian labor** | Actual accelerated labor costs[a] (loaded with G&A + overhead rates to fund indirect costs) | Actual accelerated labor costs[a] |
| | **Mission-specific training: Labor** | | |
| | **Mission-specific training: Nonlabor** | Actual cost (loaded with G&A rate to fund indirect costs) | Actual cost |
| | **CTR labor** | | |
| | **Nonlabor** | | |
| **Indirect costs** | **Civilian labor** | Actual accelerated labor costs[a] | Actual accelerated labor costs[a] + G&A[b] |
| | **General training: Labor** | | |
| | **General training: Nonlabor** | Actual cost | Actual cost[a] + G&A[b] |
| | **CTR labor** | | |
| | **Nonproductive time** | Actual accelerated labor costs[a,c] | Actual accelerated labor costs[a] |
| | **Nonlabor** | Actual cost | Actual cost |
| | **Internal bills/service cost centers** | Actual cost[d] | Actual cost[d] |

SOURCE: Discussions with NAWCWD; FMR, vol. 11b.
NOTES:
[a] Includes accruals for leave; leave accounts must be fully funded at end of year. FMR allows average costs for cost centers to be used. (These costs are not the same as stabilized rates, which are for billing purposes only.)
[b] Institutional MRTFB funding is assessed a G&A share via a lump sum to pay for management and support services provided by the G&A NWCF-funded portions of the warfare center.
[c] NWCF Labs' idle time is charged to indirect cost pools. Idle time is minimal because they have flexibility to retask and a large contractor workforce to flex.
[d] RDECOM uses "internal bills"; WCF uses "service cost centers." NWCF Labs allocates indirect costs on a basis of something other than labor hours (called "fee for service" in NWCF).
Red indicates Navy pays the cost with their appropriations. Blue indicates that reimbursable customers pay.
CTR = contractor; G&A = general and administrative.

Table F.6 shows cost accounting policies for the Navy's labs. Although all costs of lab activities are ultimately paid by customer (indicated by the blue text), NOR will usually not be zero; this means that the NWCF cash corpus could be funding costs in the short term (if there is a negative NOR). Cost accounting is performed at a detailed level during and following the year of execution and is not the same as the price (i.e., stabilized rates) charged to customers. Hence, there will be a difference between accounting of direct costs of labor during and following the year of execution and the rates charged to customers prior to execution. Actual accelerated labor costs include all labor-related costs—that is, salaries, benefits, and leave (see Table F.7). NWCF labs charge customers stabilized accelerated labor rates based on estimates of the components of these labor costs prior to the fiscal year, but cost accounting during and after the fiscal year calculates actual costs and rates. Like the AMC CONOPS, the FMR requires WCF organizations to use a tiered indirect rates structure but with a G&A tier applied to an entire organization and indirect rates applied more narrowly. The G&A rate represents a percentage of funding (thus the Section 219 recovery can be incorporated into the G&A rate) applied to all costs of the NWCF—both labor and nonlabor. Indirect rates are like Tier 2 and 3 indirect rates at RDECOM: an

indirect rate levied per DLH on direct civilian labor, for example, to pay for supervision and management within a cost center.

Table F.7 summarizes the policies for generating labor rates at Navy labs. The prices customers pay within the NWCF are set in advance of a fiscal year, so they are based on budget estimates. The stabilized rates are ordinarily not adjusted throughout the year, which can result in profits or losses (NOR). Civilian salaries are the payroll paid to civilian employees, which is averaged across each competency and labor band. Because FMR rules require WCF activities to recover a civilian equivalency rate for military labor, those salaries are also included. Civilian benefits and leave are both included through a common acceleration rate set each fiscal year. Leave and benefits are accrued throughout the year and acceleration rates can change from year to year to minimize variance between revenue and costs in those leave and benefits accounts. Indirect assessments include the G&A and an indirect rate per DLH,[11] as discussed above. The stabilized rates charged to customers include an additional charge based on the accumulated operating result (AOR), which is the net profits (or, if negative, net losses) that the NWCF organization has made in the past. An AOR charge per DLH is calculated for inclusion in the stabilized rates to customers by distributing the AOR among the expected DLHs across the organization—that is, the organization attempts to return profits to customers or recover losses from customers so that net profit in the budget will be zero once the budgeted year is finished. This AOR charge is not included in the cost accounting rates since it impacts revenue only and not costs.

There is no stabilization of costs other than civilian labor rates and indirect rates. As discussed earlier, nonlabor direct costs are commonly direct cited on a customer's funding. If they are paid by the NWCF lab, the lab charges the actual cost to the customer. Further, they are loaded with the G&A rate, which contributes toward indirect cost pools. Nonlabor indirect costs are included in indirect cost pools. Table F.8 provides a high-level summary of expenses and revenues across the Navy laboratories. All labs possess a substantial share of costs that are not stabilized. Nonstabilized costs at NAWC are especially large, in part because MRTFB costs are not stabilized (which is discussed in greater detail below). Overall operating results are relatively small compared with overall costs and revenues.

[11] The FMR suggests allocating the operations overhead rate on the basis of direct labor hours (FMR, vol. 11B [131105]). However, the FMR also suggests using "total incurred costs" as an allocation base for the G&A rate; hence the G&A rate would be a percentage of direct plus overhead costs (FMR, vol. 11B [131106]). The FMR does allow deviations from this guidance if it results in a more equitable allocation of G&A costs. NAWCWD allocates G&A based on a per-DLH basis and reduces the rate in some cases, such as personnel who are working off-site and not benefiting directly from on-site G&A costs.

## Table F.7. NWCF Laboratory and MRTFB Labor Rates Policies

| | Category | NWCF Labs | Navy MRTFB |
|---|---|---|---|
| Civilian/ military labor rates | Salaries | CIV: Salaries across each competency/labor band<br>MIL: Civilian equivalency rate across each competency/labor band | CIV: Salaries across each competency/labor band<br>MIL: No charge |
| | Benefits | CIV: Total projected benefits through common acceleration rate | |
| | Leave | CIV: Included in common acceleration rate<br>Assumes 1,740 or 1,750[a] productive work hours | |
| | Indirect assessment | G&A rate + competency production overhead rate on direct labor | N/A |
| | AOR | Subsidy (tax) to return (pay for) net profits (losses) over all previous years<br>[Included in stabilized labor rate only] | N/A |
| CTR labor rates | Contract cost allocation | Direct costs: Unique costs: Actual contract cost[b] direct charged to customer for that order[c]<br>Indirect costs: Included in indirect assessment (see above) | Actual direct contract cost[b] direct charged to customer for that order |
| | Indirect assessment | Stabilized rate: N/A<br>Direct costs: G&A rate[d] | N/A |

NOTES:
[a] Each Navy Systems Command has a standard productive work year (e.g., NAVAIR is 1,740; SPAWAR is 1,750).
[b] Actual contract cost includes contractor salaries, benefits, leave, G&A, fees, and so on.
[c] Navy labs price all direct nonlabor costs as unique costs. They are direct charged to the customer.
[d] Navy labs charge contract administration costs as direct costs to customer (loaded with indirect rates).
CIV = civilian; CTR = contractor; G&A = general and administrative.

## Table F.8. NWCF FY 2016 Expenses and Revenues ($Millions)

| | NRL | NAWC | NSWC | NUWC | SSC | Total |
|---|---|---|---|---|---|---|
| Civilian personnel compensation & benefits | 359.1 | 2,042.3 | 2,397.7 | 675.6 | 1,144.3 | 6,619.0 |
| Military personnel compensation & benefits | 3.5 | 15.0 | 15.4 | 2.9 | 7.7 | 44.5 |
| Depreciation expenses | 13.5 | 29.8 | 27.3 | 11.7 | 6.7 | 89.0 |
| Other expenses | 490.1 | 2,504.8 | 1,633.5 | 405.9 | 1,115.8 | 6,150.1 |
| Stabilized costs | 442.5 | 1,731.2 | 2,568.2 | 693.2 | 1,140.1 | 6,575.2 |
| Nonstabilized costs | 423.7 | 2,860.7 | 1,505.7 | 402.9 | 1,134.4 | 6,327.4 |
| Total costs | 866.2 | 4,591.9 | 4,073.9 | 1,096.1 | 2,274.5 | 12,902.6 |
| Total revenue | 866.8 | 4,562.4 | 4,116.3 | 1,105.7 | 2,278.4 | 12,929.6 |
| Operating result | 0.6 | –29.5 | 42.4 | 9.6 | 3.9 | 27.0 |

SOURCE: NWCF President's Budget, FY 2018.
NOTES: NOR can be different than operating result due to adjustments (e.g., capital surcharge).
NRL = Naval Research Laboratory; NAWC = Naval Air Warfare Center; NSWC = Naval Surface Warfare Center; NUWC = Naval Undersea Warfare Center; SSC = Space and Naval Warfare Systems Command (SPAWAR) Systems Center.

Table F.8 shows that the costs of military personnel are relatively small compared with the costs of civilian personnel at Navy labs, as there are few military personnel assigned to the labs.

In our discussions with NAWCWD, we learned that only some costs from third parties (such as the Navy Regions providing base support) are charged to the labs. In general, only the costs directly attributable to the NWCF activity are charged to the activity, and the NWCF passes these costs as direct costs to a customer or includes the costs in indirect cost pools. Other costs are paid by the third party. NAWCWD personnel did not have visibility into what costs were being paid by third parties, since those costs never impact their finances.

### *Funding Models for Acquisition Support Engineering in the U.S. Navy*

The Navy uses a hybrid model to obtain support staff for its PEO and PM offices.[12] It contains elements of the matrix model that the USAF uses through the AFLCMC and allows additional flexibility by enabling Navy PEOs and PMs to purchase additional staff from NWCF-funded labs. Table F.9 summarizes this support model. Both the immediate program office staff and matrixed staff are centrally funded from appropriations.

**Table F.9. Support to Navy PEOs and PMs Affiliated with a Systems Command**

| Type of Support | Immediate Program Office Staff | Matrixed Staff | Warfare Center Staff |
|---|---|---|---|
| Source of support | Headquarters mission-funded pool of FTEs (centrally funded using appropriations) | | Bought from NWCF |
| Assignment | Program | Pooled directorates | Warfare center |
| Functions | • Program management (program managers, deputy program managers, assistant program managers, etc.)<br>• Logisticians<br>• Business/financial managers<br>• Technical managers (engineers) | • Contracting<br>• Comptroller<br>• Legal<br>• Engineering personnel | • Technical<br>• Engineering |

The program office staff are aligned with individual programs and typically stay through the completion or termination of the program.

The matrixed staff, which includes many of the engineers who provide support to the programs, is organized into pooled directorates that can be easily shifted among programs as program needs and priorities change. Typically, matrixed personnel are reassigned within two

[12] The study team did not talk to customers of the other military departments and did not focus our discussions with the labs on how they supply support staff to PEOs and PMs. However, the study team had discussions with a former leader at NAVSEA, who explained the model for which NAVSEA PEOs and PMs obtained support staff.

weeks. The matrixed staff possess programmatic decisionmaking authority. For example, matrixed staff includes personnel with contracting warrants, legal authority, comptroller authority, and technical authority to make final technical/engineering decisions.

Warfare centers provide an additional adaptability that does not exist with a purely in-house matrix model. Programs can "purchase" personnel from the warfare centers through the NWCF to engage in technical and engineering tasks. Such personnel are often co-located with the program personnel. Unlike the Navy's matrixed staff, however, these personnel do not have the same technical decisionmaking authorities. For example, the NAVSEA chief engineer can only appoint technical warrant holders from the matrixed staff who can make decisions like certifying the test depth for submarines.

According to warfare center personnel, NWCF rules offer flexibility to reduce indirect rates on staff that they provide to the programs. For example, the NSWC can supply these personnel without charging indirect rates while offering a reduced G&A (less than 20 percent of the normal rate) for personnel who are assigned off-site.

### *Funding Models for U.S. Navy MRTFBs*

Although Navy MRTFBs operate within warfare centers funded through the NWCF, Navy MRTFBs are subject to the same funding rules as the other services' MRTFBs. DoD customers pay for the actual direct costs while the military departments pay for indirect costs using their appropriations. Ordinarily, WCF organizations are not permitted to accept appropriations. However, the FMR allows organizations to operate partially within a WCF and partially using appropriations.[13] If a "preponderance" of activity (e.g., DLHs) within the organization is funded through a WCF, then all activity—including the non-WCF activity—can be funded through the WCF initially. This policy allows the small MRTFBs, funded through appropriated funds and reimbursement, to be funded within the same systems as the WCF activities. Further, the FMR excludes MRTFB capital items from being included in a WCF capital budget,[14] so capital investments are funded either from appropriations or provided by other organizations, and no depreciation is recovered to fund these items.

G&A presents a complication to the Navy labs since G&A costs benefit all activities in a lab, including both NWCF-funded laboratory work and MRTFB work. The FMR rules on dual-funded WCF require that costs be allocated to the WCF activities and appropriated activities; thus the MRTFB must contribute toward G&A costs. Since these are indirect costs, MRTFB customers cannot pay the costs, so they must be paid by appropriations. NAWC, for example, estimates a "G&A share" the MRTFB institutional appropriations pay. Thus, Navy labs with an MRTFB do, in effect, receive appropriations to fund indirect costs.

[13] FMR, vol. 2B (090107N).

[14] FMR, vol. 2B (090104E).

In all, Navy customers are paying for actual direct costs. Recall from above that NERP allows organizations to choose whether to bill customers either the stabilized rate or actual rate. Whereas NWCF activities charge most customers stabilized accelerated labor rates—that is, estimates of labor rates prior to the fiscal year—they charge MRTFB customers with actual accelerated labor costs adjusted throughout the year as necessary. MRTFB customers pay no indirect rates. MRTFB and other test and evaluation investment appropriations pay for indirect costs—including MRTFB overhead and a share of G&A costs for the organization—and capital investment costs.

The study team did not establish a detailed comparison of what costs are included in the Navy MRTFB versus costs that are outside the MRTFB. The Navy's organizational structure clearly gives them the ability to lower MRTFB costs relative to the Army or USAF. An obvious example is that there is no MRTFB in the Navy for either electronics (i.e., the SPAWAR Systems Center [SSC] does not manage any MRTFBs) or surface vessels (i.e., the NAVSEA's NSWC does not manage any MRTFBs). One particularly illuminating example is NSWC Port Hueneme Division's White Sands Detachment, which performs testing. It is located at WSMR and thus benefits from the Army's MRTFB funding for the range but is not itself part of the MRTFB. Further, by having portions of labs designated as MRTFB and others not designated as MRTFB, the Navy has flexibility in designating personnel as outside the MRTFB even if they work on tests that use the MRTFB. The Army does not have such flexibility—ATEC personnel (except at RTC or at capabilities outside the MRTFB, like YPG's counter-IED test capabilities) are part of the MRTFB.

## Funding Models in the U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center

USACE operates the U.S. Army ERDC, which consists of several laboratories performing research in civil and military engineering and other areas of interest in the Army and USACE. USACE financial operations are distinct from the U.S. Army.[15] Much of its funding comes through the civil works program, which is funded through the Energy and Water Development and Related Agencies Appropriations Act rather than with defense funding. ERDC has similar funding sources as RDECOM's laboratory activities: appropriations (from the Army's RDT&E appropriations) and reimbursable funding from customers.

Our review of USACE funding policies focused on civil works revolving fund policies since ERDC largely uses these policies. USACE also has a separate set of policies for military

[15] USACE uses the Corps of Engineers Financial Management System as its financial ERP system (see U.S. Army Corps of Engineers, "Corp of Engineers Financial Management System [CEFMS] Support Services," Washington, D.C.: USACE, Solicitation Number W912DY-16-RFI-CEFMS, March 4, 2016).

construction supervision and administration,[16] which governs how USACE manages military construction funds and other funds it oversees for construction.

USACE personnel indicated their goal is to run the civil works revolving fund using standard business practices. As an example, according to USACE personnel, the fund has passed independent audits for nine straight years (and an additional year following our conversation). USACE issues an annual report with detailed financial statements that includes the auditor's opinion along with materiel weaknesses and other issues identified by the auditor; thus USACE voluntarily provides a large degree of transparency over its finances.

USACE uses a revolving fund to finance its operations.[17] Defense WCFs are also a type of revolving fund but are subject to additional rules that are specific to DoD working capital funds. The following major similarities and differences exist between the USACE revolving fund and DoD WCFs:

- The USACE revolving fund does not stabilize rates for customers in advance like the DoD WCFs. USACE sets rates and adjusts rates and spending throughout the year to minimize variance—that is, to break even on an annual basis. Therefore, the USACE revolving fund is more similar to RDECOM's practices than to Navy labs.
- The USACE revolving fund can accept both appropriations and reimbursables from customers. With some exceptions, DoD WCFs only accept reimbursables from customers. For example, the Office of Naval Research serves as the customer for S&T work in Navy labs. This flexibility is more similar to RDECOM than Navy labs.
- The USACE revolving fund finances most of its indirect costs by recovering indirect funding from customers using indirect rates. The USACE revolving fund has flexibility like RDECOM to accept appropriations to fund indirect costs, which is not allowed in DoD WCFs. A prominent example is headquarters costs, which are paid for by appropriations at RDECOM and USACE but charged to customers of Navy labs.
- Like DoD WCFs, the USACE revolving fund allows USACE organizations to spend money from the corpus and bill those costs to customers for reimbursement later. Reimbursable funds require reimbursable authority and fund operations through transfers of commitments, obligations, expenses, and disbursements. Thus, both the USACE revolving fund and DoD WCFs look more similar to independent contractors than RDECOM.
- Both the USACE revolving fund and DoD WCFs can pay for capital costs out of their cash corpus and recover it over time through depreciation charges. USACE commonly depreciates maintenance costs. For example, dredges have large, infrequent maintenance costs, so it is appropriate to charge customers across fiscal years for those costs rather than charging only customers in the year of maintenance (especially since maintenance takes the dredges out of service for a period of time, reducing the potential recovery base if indirect recoveries were limited to the year of maintenance).

[16] See U.S. Army Corps of Engineers, "Construction: Financial Management," Washington, D.C.: USACE, ER 415–1–16, September 30, 1993.

[17] 33 U.S.C. 576 authorizes the USACE revolving fund as of July 1, 1953.

- All reimbursable models have variances—that is, differences between revenue and expenses. The USACE revolving fund and DoD WCFs use their cash corpus as a buffer against these variances. Variances in reimbursable organizations impact those organizations appropriations.
- The USACE revolving fund and reimbursable organizations attempt to minimize variance by adjusting rates throughout the year. By comparison, WCF organizations, which stabilize rates throughout the year, have larger variances.

Overall, the goal of the USACE revolving fund is for accounting revenues and costs to balance during each fiscal year. The goal of RDECOM is for cash inflows and outflows to balance during each fiscal year. The goal of DoD WCFs is for accounting revenues and costs to equal each other in the long run.[18]

As mentioned above, USACE operates like RDECOM in accepting appropriations and reimbursables from customers to fund its work. Just like RDECOM, USACE recovers indirect costs from both appropriations and reimbursables. USACE personnel emphasize they manage finances on a "project" basis and policies are ambivalent to the source of project funds.

As with the other organizations, the study team summarized cost accounting policies for USACE. This summary is based on discussions with USACE and ERDC personnel and reviews of USACE policy, particularly ER 37–1–30. Table F.10 shows USACE cost policies for headquarters elements, districts, and ERDC. Headquarters costs are paid through USACE appropriations. USACE is organized into districts and ERDC, which operate with similar policies that pass along most costs to customers. As a DoD laboratory, ERDC charges a Section 219 tax. Both districts and ERDC have similar policies for determining labor rates (which will be discussed in depth in the next table). However, because ERDC relies on a substantial amount of contractor labor, and civilian and contractor labor are substitutable for each other, ERDC loads contractor direct labor and other nonlabor direct costs with indirect rates. While districts recover indirect costs from customers, ERDC receives a small amount of appropriations from the Army to pay for indirect costs, like RDECOM. ERDC reduces its indirect rates on military projects to compensate.

[18] When WCF organizations develop their stabilized rates, they attempt to recover past losses or return past profits and bring their NOR to zero. Although they constantly aim to break even, variances while rates are being developed and in the year of execution mean they will never quite break even.

**Table F.10. USACE General Cost Practices**

| | Category | USACE HQ, Division HQ, ERDC HQ | Districts | ERDC |
|---|---|---|---|---|
| | **Sec. 219 tax** | N/A | N/A | 3% tax off the top |
| **Direct costs** | **Civilian labor** | N/A | Actual salaries × (1 + effective rate) (assessed with G&A and DOH rates) | |
| | **Mission-specific training: Labor** | | | |
| | **Mission-specific training: Nonlabor** | N/A | Actual cost | Actual cost (assessed with G&A and DOH rates) |
| | **CTR labor** | | | |
| | **Nonlabor** | | | |
| **Indirect costs** | **Civilian labor** | Actual salaries × (1 + effective rate) | Actual salaries × (1 + effective rate) | Actual salaries × (1 + effective rate)[b] |
| | **General training: Labor** | | | |
| | **General training: Nonlabor** | Actual cost | Actual cost | Actual cost[b] |
| | **CTR labor** | | | |
| | **Nonproductive time** | Actual salaries × (1 + effective rate) | Actual salaries × (1 + effective rate) | Actual salaries × (1 + effective rate)[b] |
| | **Nonlabor** | Actual cost | Actual cost | Actual cost[b] |
| | **Internal bills/service cost centers** | N/A | Actual cost[a] | Actual cost[a,b] |

NOTES:
[a] USACE uses "shop and facility services" and usually charged directly to projects rather than considered as indirect. Includes for things like dredges, centrifuges, and the cold test room.
[b] A portion of the G&A is paid from OMA (about $25 million to $30 million), which reduces G&A rates on military projects.
Red indicates the organization pays the cost with their appropriations. Blue indicates that reimbursable customers pay.
CTR = contractor; G&A = general and administrative; DOH = departmental overhead.

Table F.11 summarizes USACE labor rates in detail. USACE uses each person's true salary to calculate hourly rates. Benefits and leave are both managed through cost pools and form a common "effective rate" for all civilian personnel. Instead of a tax per DLH, the effective rate and indirect assessments at USACE are taxed as a percentage of costs. Indirect rates are calculated with a tiered structure similar to RDECOM and the Navy labs. G&A rates fund G&A indirect costs across a region. They include costs such as legal and human resources that benefit all parts of the organization. Each region has four departmental overhead rates that fund indirect costs related to a specific type of function performed by the personnel. Indirect costs are pooled at the region level; so, for example, the indirect rates charged for work in the Albuquerque District (where indirect costs are relatively low) overcollect indirect recoveries and are used to subsidize work in the San Francisco District (where indirect costs are relatively high) that undercollects indirect recoveries. This policy was put into place to prevent customers from shopping around to find the cheapest district. At ERDC, which acts like a separate region, these indirect rates apply to all direct costs, including civilian personnel costs, contractor personnel costs, and nonlabor personnel costs. The resulting rate is called the "flat-rate burden." Two flat-rate burden rates exist across ERDC—one for civil works projects and one for military projects that accounts for the appropriations the Army provides for indirect costs.[19]

[19] See Engineer Pamphlet (EP) 37–1–4.

**Table F.11. USACE Labor Rate Policies**

| | Category | USACE HQ, Division HQ, ERDC HQ | Districts | ERDC |
|---|---|---|---|---|
| Civilian labor rates | Salaries | Actual salaries | | |
| | Benefits | "Effective rate" × actual salaries funds benefits and paid leave | | |
| | Leave | | | |
| | Indirect assessment | N/A | Tier 1 (G&A)/tier 2 (departmental overhead) tax on mission-funded activities only[a] | Flat-rate burden[b] on mission-funded activities |
| CTR labor rates | Contract cost allocation | Actual cost[c] | | |
| | Indirect assessment | N/A | N/A | Flat-rate burden[b] on mission-funded activities |

NOTES:
[a] "Regional Rates" are shared by districts across a region. All districts have a standardized set of four DOH cost pools.
[b] USACE "flat-rate burden" is also a Tier 1 (G&A)/2 (DOH) tax but applies to all revenue.
[c] Actual contract cost includes contractor salaries, benefits, leave, G&A, fees, and so on.
G&A = general and administrative.

USACE facilities are typically owned or leased, so facilities costs are paid by the organization either with appropriations or through indirect recoveries from projects. The treatment of military personnel depends on what activities the personnel perform. Military personnel working only on military projects are paid by the Army from the military personnel Army appropriation. Costs for military personnel working on civil works projects, however, are charged to those projects—including military projects. Discussions with personnel at ERDC revealed that few military personnel work at ERDC and that they charge their time to projects.

## Summary of Funding Models

Based on the review of funding models used across the DoD's intramural RDT&E organizations, the study team identified five potential models to assess for RDECOM and ATEC. Models differ most significantly in how they fund direct costs versus indirect costs.

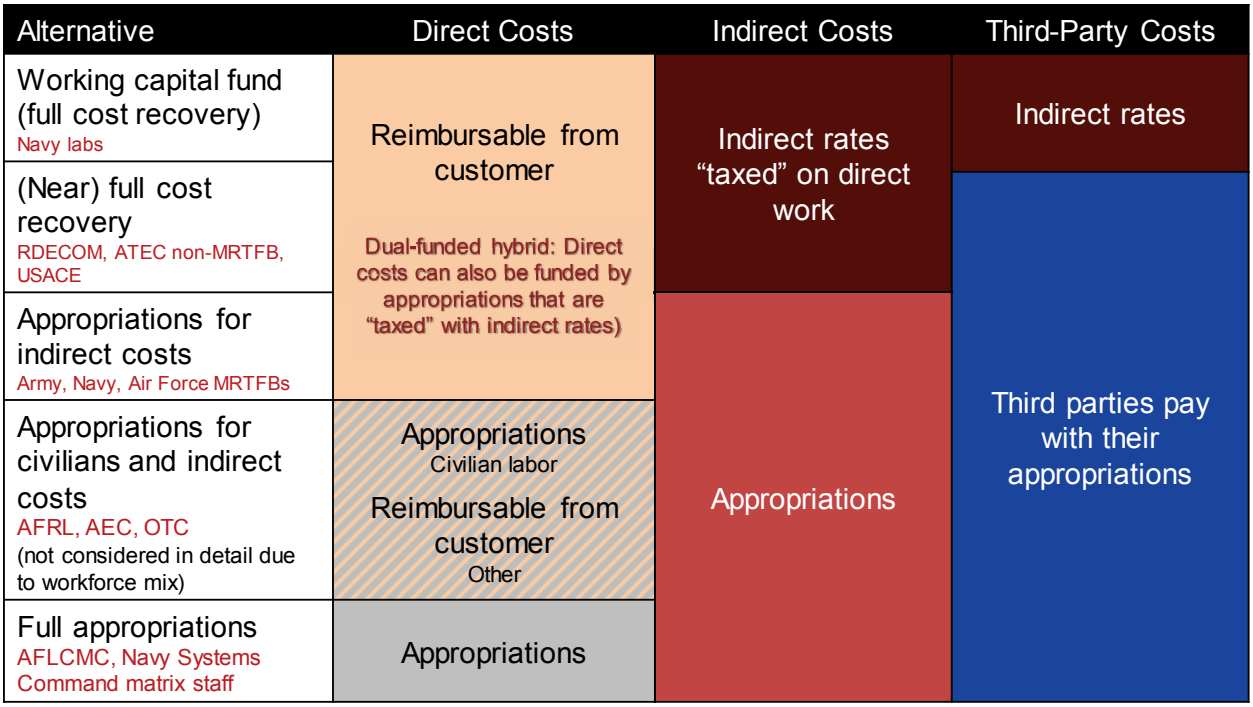
When customers pay with their own funds, we call this "reimbursable"—although direct charge and direct cite are also methods for customers to pay since they use customers' funds. When customers pay for indirect costs, they are usually taxed based on an indirect rate charged to the direct costs (usually a cost per DLH). All customer funds are pooled to pay for indirect costs since they cannot be attributed to a single customer.

Suppliers can also pay for either direct costs or indirect costs using their appropriations. In this case, appropriations are received directly by the supplier without passing through a customer.

A final category of costs includes those paid by third-party organizations (e.g., common levels of support [CLS] paid by IMCOM). As discussed throughout this report, RDECOM and ATEC do not have much visibility into third-party costs. However, the WCF model would require suppliers to recover these costs from customers.

Figure F.1 summarizes the five models by who pays for direct costs, indirect costs, and other third-party costs (this table is simplified as Figure 3.1 in the main body of this report). It is important to recognize that combinations of models can be used within organizations and that actual practices can blur the lines among models, falling somewhere in between two models.

**Figure F.1. Summary of Funding Models Used Across DoD**




### *Working Capital Fund*

WCF models possess rules that discourage appropriations for indirect costs and encourage WCF providers to include all costs of doing business in customer rates. Additional costs include capital investments (through depreciation charges) and military labor and potentially support costs currently provided by other Army organizations such as IMCOM.[20] WCF rules also create stabilized rates in advance of the year of execution. The stabilized rates, in turn, result in a profit or loss that must be returned to or recovered from customers in future years. The WCF obtains most of its funding from customers, who receive direct appropriations; however, organizations

[20] DoD policy prohibits WCF capital budgets from including MRTFB capital costs (FMR, vol. 2B [090104E1]); thus any WCF option that maintained the MRTFB designation would not charge depreciation.

can be dual funded and take both appropriations directly and customer reimbursables through the WCF.[21] For example, Navy labs and warfare centers are funded through the NWCF. The Navy's MRTFBs are under the command of some of these warfare centers but operate as an appropriated activity that adheres to the appropriations for indirect costs model.

Implementing a WCF at ATEC's MRTFBs would likely require Congress to repeal the MRTFB funding policies in the FY 2003 NDAA. Alternatively, Congress could appropriate institutional funds to the WCF to fund the MRTFB's indirect costs; however, this would be inconsistent with policies and laws requiring WCFs to recover full costs from charges to customers.

WCF activities have considerable discretion in how they price their outputs. For example, the Army's industrial operations activities, which include depot repair and manufacturing, price some common maintenance activities using flat rates (e.g., a flat rate per vehicle for an overhaul). Activities can generate profits and losses if the costs to complete these activities are lower or higher than anticipated. Navy labs and warfare centers, on the other hand, use DLHs as their unit of output. The Navy sets a stabilized average cost per labor hour and serves as a ceiling for the average labor rates the Navy can charge customers. The actual costs charged to customers vary by the salary and benefits of the person providing the DLH. Annual profits and losses tend to be small. If RDECOM or ATEC were to transition to the WCF model, they would likely emulate the Navy's practice of using DLHs as the unit of output.

### *(Near) Full Cost Recovery*

Under (near) full cost recovery, suppliers recover most of their costs from direct charges to projects assessed with indirect rates. (Near) full cost recovery is the status quo at both RDECOM and RTC, where projects can be funded by customers through reimbursables or appropriations (e.g., O&M Army [OMA] or S&T). Suppliers can still receive appropriations for some indirect costs and can receive services and equipment for "free" from third-party organizations like IMCOM and program managers.

USACE, including its ERDC, uses a similar model that combines appropriations and reimbursables from customers to fund direct costs, on which it recovers most of its indirect costs.[22]

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[21] RAND Arroyo Center explored dual-funded concepts for RDECOM and ATEC. Options exist for both commands to partially move into the WCF (e.g., RDECOM could move its customer reimbursable activities to the WCF and continue receiving direct appropriations for other activities, similar to the status quo). However, discussions with WCF experts at AMC revealed significant information system impediments that would likely make operating a dual-funded WCF untenable without significant efforts to integrate GFEBS and LMP.

[22] USACE uses a revolving fund, which is similar to the working capital fund (Alternative #5). However, USACE does not stabilize rates and aims to recover its costs each year without a profit or loss, thus it is most similar to Alternative #4.

As with the WCF model, Congress would need to rescind the MRTFB policies in the FY 2003 NDAA for this model to be implemented at ATEC's MRTFBs. This would constitute a return to pre–FY 2003 NDAA policies at test centers where indirect costs were partially funded through indirect assessments to customers.

Because RDECOM is not governed by MRTFB policies, the Army possesses considerable latitude to blend funding models. For example, some types of indirect costs are funded with appropriations for indirect while others are recovered on a full cost recovery basis by charging customer indirect rates.

### *Appropriations for Indirect Costs*

Appropriations for indirect costs is the status quo for all DoD MRTFB test centers. MRTFB customers pay only for direct costs that can be attributed to a specific test or a specific program.

Appropriations for indirect costs allows the Army to sustain low-demand capabilities with relatively high indirect costs even as workload fluctuates. Thus, MRTFBs can sustain test capabilities using appropriations even through lulls in workload.

For most RDECOM activities, this alternative would represent a shift toward greater dependence on appropriations to cover indirect costs but could be tailored to allow customers to invest in and sustain laboratory facilities, benefiting projects from other customers.

### *Appropriations for Indirect Costs and Civilian Labor Costs*

Appropriations for indirect costs and civilian labor costs represents a cross between full appropriations, which funds all costs with appropriations, and appropriations for indirect costs, which requires customer funding for direct costs only. AFRL is nearly fully funded for its indirect and civilian costs, with only a small level of reimbursables. Similarly, outside of its test centers, ATEC uses this funding model for OTC and AEC. However, in these organizations the duties of contractors and civilians are largely different.

RAND Arroyo Center did not consider in depth a potential alternative providing appropriations for indirect costs and civilian labor costs. This funding model would not be appropriate for ATEC's test centers or RDECOM because contractor personnel and civilian personnel are often interchangeable. This interchangeability would likely result in inequitable charges to customers based on the composition of the project team. Additionally, service providers and customers could potentially "game" the composition to make projects cheaper or more expensive to customers, likely exacerbating current issues of transparency and appropriateness.

### *Full Funding Through Appropriations to Service Providers*

Full appropriations fund all the supplier's costs through appropriations to the supplier without any reimbursement from customers. Customers continue to fund their own costs

internally, and third-party providers (e.g., PM ITTS, IMCOM) could continue to provide equipment and services without reimbursement from the supplier or customers.

RAND Arroyo Center's review of DoD intramural research, development, and testing service providers did not find this approach being used in service provider organizations. As far back as the 1972, the Bergquist study of DoD test facilities[23] found that all DoD test organizations required some level of customer funding, although user funding was small at a handful of test ranges like White Sands.

RAND Arroyo Center's review found that PEO and PM offices fund their own staff using their own appropriations. A reorganization of Army engineering support could move RDECOM matrixed personnel (who are currently provided to Army PEOs and PMs on a reimbursable basis) into the PEO and PM organizations. Such a reorganization would lead to an insourcing of personnel, where the PEO and PM organizations would be responsible for obtaining funding to pay the personnel and would be responsible for funding all indirect costs associated with those personnel. In other words, PEOs and PMs could adopt the personnel model used by most Army organizations, who own their own personnel instead of relying on customer-provider relationships to obtain personnel; however, such a model would likely reduce those organizations' flexibility and agility.

Organizational changes are beyond the scope of this study, so we did not explore them in depth. Such a reorganization would likely reduce personnel flexibility: with full appropriations, TDAs must be followed closely. Since it takes time to change a TDA, there is a delay between the time personnel are needed and when they can be hired. Navy and Air Force PMs try to alleviate this inflexibility in several ways. Both the Navy and Air Force employ a matrixed personnel concept, where personnel are assigned to organizations based on their competency but assigned to programs based on demand. This arrangement allows managers to shift personnel without having to modify manning documents.

In FY 2018, AFLCMC funding for acquisition personnel is shifting from O&M to RDT&E, providing flexibility to reprogram each program element with up to $10 million of the systems' RDT&E funding.[24] Nevertheless, AFRL (which also has nearly full appropriations for civilian personnel) and AFLCMC both indicated that their models lack flexibility in hiring, and both are searching for methods like increased customer funding (AFRL) or shifting support personnel to (self-)reimbursable positions (AFLCMC).

The Navy, on the other hand, achieves flexibility at the margins by supplementing their in-house staff with personnel purchased on a reimbursable basis from their warfare centers that are funded through the NWCF.

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[23] See Bergquist et al., 1972.

[24] By comparison, AFLCMC has seven program elements for their acquisition workforce that average $169 million each (Air Force President's Budget, FY 2018).

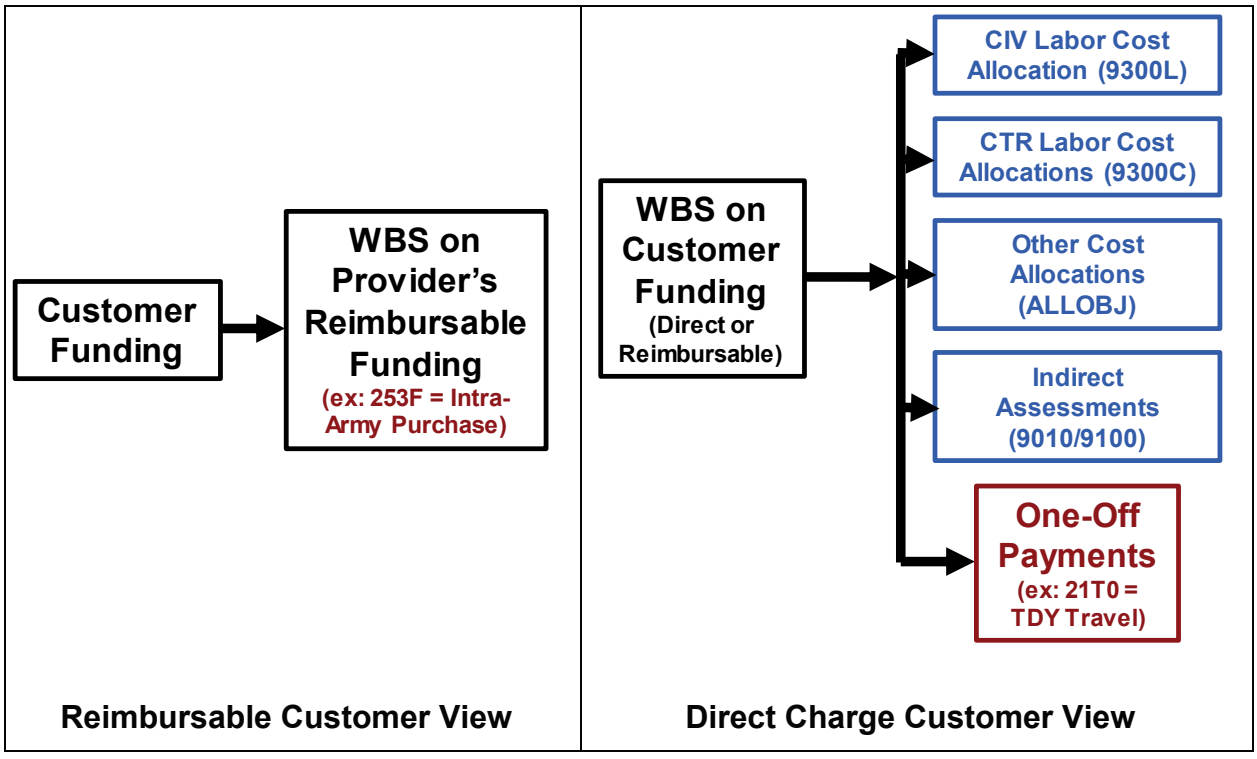
*Direct Cite and Direct Charge*

Direct cite is a method combining features of direct appropriations with features of reimbursables. Direct charge represents a direct cite special case the Army implemented in GFEBS.

Like direct appropriations, direct cite and direct charge utilize direct authority, whereas traditional military interdepartmental purchase requests (MIPR) utilize reimbursable authority; therefore they conform to the guidance from the OUSD(C) to reduce reimbursables. However, like traditional MIPRs, direct cite and direct charge enable a customer-supplier relationship.

Figure F.2 compares a traditional reimbursable transaction to a direct charge in GFEBS. In a reimbursable transaction (right), the customer transfers funds to the provider, which to the customer looks like a purchase. In contrast, in a direct charge in GFEBS (left) the customer gives the provider access to their direct appropriations, which they spend directly. Therefore, the customer sees different types of cost (e.g., civilian labor, indirect assessments).

**Figure F.2. Customer Views for Direct Charge and Reimbursables Transactions**




NOTES: CIV = civilian; CTR = contractor; WBS = work breakdown structure.

The Army generally requires direct charges when customers and suppliers both use GFEBS. However, AMC (and hence RDECOM) has an exception to this requirement due to direct charge limitations discussed later in this report.

"Direct cite," as the term is used by Army commands on GFEBS, usually refers to a customer providing funding to leverage a supplier's contract. RDECOM uses direct cites extensively to provide contractor labor to its customers. In FY 2016, for example, RDECOM received $3.0 billion in reimbursables from customers and facilitated $2.6 billion in direct cite orders.[25] The funds never touch RDECOM, although RDECOM charges a small fee to cover the contracting costs they incur when creating a direct cite order.

[25] In FY 2016, ATEC facilitated only $5 million in direct cite versus $489 million in reimbursables. ATEC's contracting model, which is discussed in detail elsewhere in the report, usually requires its contractors to be independent of its customers to ensure independence on tests. Therefore, direct cite, in which customers would pay contractors directly, is incompatible.

# Appendix G. Overview of Auditability, Transparency, and Appropriateness in DoD

Throughout this study, Army and DoD stakeholders, as well as RDECOM and ATEC customers, have expressed concern regarding reimbursable funding "auditability" and "transparency." During the study team's initial conversations, it was apparent that the understanding of these terms varied greatly across the Army. During initial discussions, Army stakeholders and customers indicated that their concerns focused on the types and amounts of rates charged by these organizations to their customers and whether those rates were appropriate. Though the "appropriateness" of the rates was the focus of many concerns, these stakeholders and customers described their concerns using the terms "auditability" and "transparency." These terms, "auditability" in particular, have precise meanings when used by accountants and other financial experts. Confusion over the terminology leads to miscommunication within the Army.

To define the above terms, the study team spoke to multiple financial and operational stakeholders about what the terms meant to them and reviewed U.S. government and DoD regulations in search of concrete definitions. A definition of auditability was easier to find than for transparency and appropriateness and necessitated synthesizing definitions based on the reviewed materials and discussions. Once this was done, the study team asked Deloitte to validate these definitions. This chapter reviews those definitions and identifies the key criteria that constitute those financial areas and gives real-world examples of how the failure to meet these criteria have caused problems for Army organizations during audits.

## U.S. Government Definitions of Financial Auditability, Transparency, and Appropriateness

### *Financial Auditability*

The Government Accountability Office (GAO) (2011) classifies three types of audits: financial audits, attestation engagements, and performance audits.[1] The focus of financial auditability is on financial audits that "provide an independent assessment of whether an entity's reporting financial information (e.g., financial condition, results, and use of resources) are

[1] U.S. Government Accountability Office, *Government Auditing Standards, 2011 Revision*, Washington, D.C.: GAO-12-331G, December 2011.

presented fairly in accordance with recognized criteria."[2] The other types of audits are more general and can be financial or nonfinancial in nature.[3]

Auditability is a necessary aspect of an organization's financial transactions. It allows for the organization to validate its financial statements through an outside auditor who examines the organization's finances and determines whether the financial statements have been presented fairly. Within U.S. government financial and accounting documentation, "auditability" focuses on an organization's ability to accurately convey financial information to an independent auditor. A concrete definition that applies DoD-wide comes from the Financial Improvement and Audit Readiness (FIAR) Guidance published by the DoD comptroller/financial officer in 2016. This definition states that:

> Auditability is: "Management's ability to assert that its financial statements, a financial statement line item, or a process/sub-process has sufficient control activities and adequate documentation to undergo an examination or a financial statement audit by an independent auditor and obtain an opinion from the independent auditor, stating that the aforementioned items are free of material misstatement."[4]

As the 2016 FIAR definition indicates, auditability is the ability to prove the accuracy of its financial transactions outward to an independent auditor by providing information on financial statements, showing control of those processes and providing the relevant supporting documentation.

### *Transparency*

Finding a concrete definition of transparency was a more difficult challenge. Financial regulations like FIAR only spoke of transparency in terms of DoD's relationship to the public.[5]

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[2] GAO, 2011, p. 14.

[3] In attestation engagements, a third party reviews evidence to generate an opinion—for example, "an entity's compliance with requirements of specified laws" or "an entity's internal control over financial reporting" (GAO, 2011, p. 190). GAO defines performance audits as "audits that provide findings or conclusions based on an evaluation of sufficient, appropriate evidence against criteria" (GAO, 2011, p. 17). Examples include "assessing the extent to which legislative, regulatory, or organizational goals and objectives are being met" and "determining whether a program produced intended results or produced results that were not consistent with the program's objectives" (GAO, 2011, p. 191).

[4] An update to the FIAR in 2017 (U.S. Department of Defense, Office of the Under Secretary of Defense [Comptroller]/Chief Financial Officer, *Financial Improvement and Audit Readiness [FIAR] Guidance*, Washington, D.C.: DoD OUSD[C], April 2017) modified this definition, cutting it back substantially so that it only requires the organization be ready to "begin" an audit. The new definition contains no requirement that management obtain a clean opinion (OUSD[C], 2017, p. E-1). Hence the modified definition is closer to a definition of "audit readiness" (which FIAR does not formally define). Everybody we spoke with considered the ability to pass an audit a clear requirement for "auditability"; thus, we focus on the 2016 FIAR definition.

[5] U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Financial Improvement and Audit Readiness (FIAR) Guidance*, Washington, D.C.: DoD OUSD(C), April 2016, p. 32.

Likewise, statutes like the Digital Accountability and Transparency Act of 2014 attempted to put more information on the internet to improve the public's ability to see how the U.S. government was spending money with the intent of "improving efficiency and transparency in federal spending."[6] The term "transparency," however, was never clearly defined.

Discussions with U.S. Army and other DoD stakeholders shed some light on how the term "transparency" was used and interpreted. From these discussions, it became clear, in the study team's opinion, that one definition of transparency meant the ability for management—both within an organization and at higher levels, like HQDA—to reach down into their organization to understand detailed financial information, thus enabling more effective management throughout the Army. Transparency was also thought of in the context of providing clear and understandable information on rates and other financial information to a customer, who demands this information to ensure that their funding is being used effectively.

### *Appropriateness*

After examining the terms "auditability" and "transparency," the study team believed that the concerns about RDECOM's and ATEC's rates were not fully explained by the terms "auditability" or "transparency." To address this gap, the study team created a third term, "appropriateness," which encompasses many concerns about reimbursable rates. There are three main requirements for costs or charges to customers to be considered appropriate. First, they must follow regulations. Many stakeholders were concerned that reimbursable charges ran afoul of regulations, such as the FMR. Second, appropriate costs must be reasonable to the work performed. A supplier's costs should be necessary costs and resources should be spent efficiently and effectively in order for the supplier to be an effective steward of the customer's funding. Third, appropriate charges to customers are applied equitably across customers. In particular, customers were concerned that different customers were subjected to different rules, where suppliers increased rates to customers who could afford to pay more. An appropriate cost recovery system subjects customers to a common set of rules, albeit one that can charge customers different rates—but only if it is justified. For example, it is appropriate for customers who require more experienced labor or costly nonlabor inputs to pay more for those expensive resources, provided that these increased costs are determined by a consistent set of rules applied uniformly across all customers.

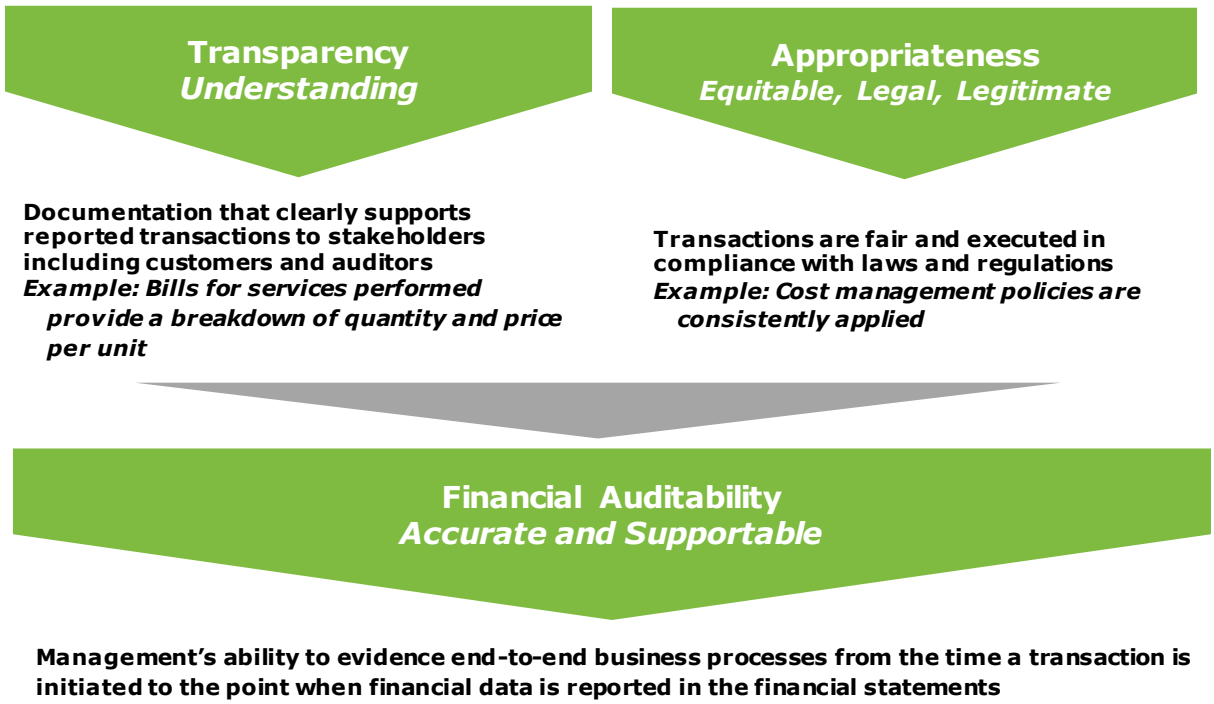
Including a definition of "appropriateness" encompassing financial concerns not covered by "auditability" or "transparency" increased the productivity of discussions because it created a common vocabulary.

[6] Public Law 113–101, Digital Accountability and Transparency Act of 2014, May 9, 2014.

## Synthesis of Definitions

The study team worked with Deloitte to synthesize definitions of auditability, transparency, and appropriateness. Deloitte's audit experience brought expertise in how these terms were understood in the financial world and ensured that these terms were defined in ways that are consistent with auditing and accounting practice, both within the DoD and in the private sector. The final definitions are shown with examples in Figure G.1.

**Figure G.1. Definitions of Transparency, Appropriateness, and Financial Auditability**




SOURCE: RAND Arroyo Center and Deloitte.

## Review of DoD Criteria to Meet Auditability Standards

Several key criteria are identified in U.S. government and DoD literature as critical to supporting financial auditability. The study team reviewed financial guidelines such as the FIAR, GAO reports related to audits, and U.S. government guidelines on conducting audits and held discussions with the U.S. Army Audit Agency (AAA). Table G.1 lists common criteria for auditability that the study team identified from these sources.

**Table G.1. DoD Criteria for Financial Auditability**

| Auditability Criteria | Source |
|---|---|
| Cradle-to-grave accounting of transactions | FIAR |
| Consistent and effective reviews to identify problems/Reconciliation plans | FIAR/GAO |
| Availability of supporting documentation | FIAR/AAA |
| Are calculations reproducible? | FIAR |
| Are naming conventions standardized? | FIAR/AAA |
| Do auditors have full and unrestricted access? | DoDI 7600.02 |
| Do cost categories accurately reflect expenses? | FIAR/AAA |
| Are the data of sufficient quality? | GAO |
| Can data be transferred between systems? | AAA |

SOURCES: U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Financial Improvement and Audit Readiness (FIAR) Guidance, Washington, D.C.: DoD OUSD(C), April 2016; U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Financial Improvement and Audit Readiness (FIAR) Guidance, Washington, D.C.: DoD OUSD(C), April 2017; U.S. Government Accountability Office, Financial Audit Guide: Auditing the Statement of Budgetary Resources, Washington, D.C.: GAO-02-126G, December 2001; AAA = discussions with Army Audit Agency personnel; U.S. Department of Defense, Audit Policies, Washington, D.C.: U.S. DoD, Department of Defense Instruction Number 7600.02, October 16, 2014, revised March 15, 2016.

As Appendix H discusses in detail, as an auditor, Deloitte's evaluation of the financial auditability of the alternative funding models focuses on the KSDs organizations must maintain and provide to auditors on request. FIAR defines KSDs as "sufficient, relevant and accurate audit evidence" that "support account transactions and balances."[7] Deloitte found that reliable KSDs are sufficient for generating an unqualified opinion from an auditor. Many of the criteria identified in Table G.1 are criteria for a strong control environment, rather than information that would be included in KSDs. Deloitte found that a weak control environment would not necessarily jeopardize an audit opinion, but financial auditors would judge that a poor control environment creates risks and therefore require a deeper, more thorough audit of KSDs.[8] Therefore, both the effectiveness of internal controls and the reliability of KSDs are important to achieving financial auditability.

[7] U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Financial Improvement and Audit Readiness (FIAR) Guidance*, Washington, D.C.: DoD OUSD(C), April 2017, p. 21. Throughout the FIAR guidance, "KSD" is defined in a manner similar to Deloitte's definition. However, the FIAR glossary defines KSDs as "Documentation retained to demonstrate control activities are properly designed and operate to satisfy [Financial Reporting Objectives], as well as support individual financial transactions and accounting events" (OUSD[C], 2017, p. E-3).

[8] See also Figure 4–42 in OUSD(C)/Chief Financial Officer (2017) for FIAR's discussion of the trade-off between control activities and the thoroughness of KSD testing.

# Appendix H. Assessment of Financial Auditability Requirements

RAND Arroyo Center asked Deloitte to perform an analysis on the auditability considerations of the various funding mechanisms. This appendix summarizes Deloitte's results.

Deloitte identified what KSDs organizations within DoD should be prepared to submit for a financial statement audit. Supplying this documentation is both necessary and sufficient to being auditable. Necessary because they are required by law or DoD financial policy. Sufficient because an organization will inform the audit results if they can fully and accurately deliver reliable evidentiary matter requested by the auditor. When the auditor issues an opinion on auditability, they are answering, "Are transactions recorded properly, are those transactions supportable, and are financial statements presented fairly?"

Deloitte's analysis focused on other factors that can impact auditability aside from the KSDs. They identified key features of the control environment for each KSD. Most KSDs require multiple control activities to generate the KSDs. As an example, when RDECOM or ATEC accepts a reimbursable MIPR from the customer, they generate an "Acceptance of MIPR" Form DD 448–2 (or a document with the equivalent information) as the KSD. Deloitte identified five components of an effective control environment to produce this KSD. First, the organization's control environment needs to demonstrate effective procedures to ensure their reimbursable authority is not exceeded. Second, the control environment needs to ensure that goods and services requested are within the scope of the agreement with the customer. Third, the control environment must ensure that the financial terms and conditions were documented and agreed on with the customer. Fourth, the control environment must ensure that the conditions and requirements regarding the reimbursable activity are clearly defined and agreed on. Finally, the control environment must demonstrate that financial systems are effective for reviewing, tracking, and storing the MIPRs and can record the proper general ledger transaction when the MIPR is accepted.

A weak control environment may not by itself cause an organization to fail an audit, but the auditor may require considerably more testing and request more documentation during an audit than if the auditor finds an organization has a strong control environment. In the example of the MIPR acceptances above, it is possible (though unlikely) that the supplier could have a weak control environment but still manage to produce reliable KSDs, in which case an auditor would judge the control environment to be weak and require more thorough testing of the KSDs but could give an unqualified audit opinion. IT controls can be particularly impactful. If, for example, a system is significant to financial reporting processes, inadequate system controls could jeopardize data because they risk the integrity of the system's data.

During a financial audit, the auditor's primary focus is compliance with financial accounting standards, and their results inform their opinion over the financial statements. If there are

instances of noncompliance with laws and regulations, an auditor may still issue a positive audit opinion on the financial statements indicating that those transactions are recorded properly; however, depending on the severity of the noncompliance issue(s), the issue(s) may adversely impact the auditor's report on internal controls and compliance with laws and regulations.

## Key Supporting Documentation (KSDs) Required for Financial Auditability

The KSDs focus on the mechanisms used for funding rather than the models used in this study. However, there is a close link, as shown in Table H.1.

**Table H.1. Relationship Between Funding Mechanisms and Funding Models**

| | Mechanisms | | | |
|---|---|---|---|---|
| **Models** | **Direct Appropriations** | **Direct Cite/Charge** | **Reimbursable** | **WCF** |
| WCF | | | | ✓ |
| (Near) full cost recovery | ✓ (Can be used) | ✓ (Can be used for direct costs and indirect recoveries) | ✓ (Commonly used for direct costs and indirect recoveries) | |
| Appropriations for indirect costs | ✓ (Indirect costs) | ✓ (Can be used for direct costs) | ✓ (Commonly used for direct costs) | |
| Full appropriations | ✓ | | | |

Table H.2 summarizes the number of types of KSDs applicable to each funding mechanism. Each type of KSD is part of a business process. Deloitte linked each type of KSD to whether it impacts auditability, transparency (to customers), and appropriateness (to customers). Those counts are in the right three columns. During an audit, an auditor would request multiple documents for each type of KSD, which could vary depending on the auditor and the command. For example, at one command an auditor might ask for only base contracts/purchase orders, while at another command the auditor might also ask for all modifications.

**Table H.2. Counts of Types of Key Supporting Documentation**

| **Counts of Types of KSDs Required by Each Mechanism** | | | | **Counts of Types of KSDs Impacting the Financial Criteria (see Fig. G.1)** | | | **Total KSDs** |
|---|---|---|---|---|---|---|---|
| Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF | Auditability | Transparency (to Customers) | Appropriateness (to Customers) | Total Number of Types of KSDs |
| 13 | 11 | 18 | 17 | 19 | 14 | 13 | 22 |

The tables below list each type of KSD and break out the KSDs by organizational role. Table H.3 lists the seven types of KSDs required of performing entities—that is, organizations performing customer work. **Forecasting and cost estimates** require that suppliers develop methodologies for forecasting customer demand as well as methodologies to determine pricing, including of indirect costs. To maintain an adequate control environment, suppliers must document their methods and estimates, and these documents must be approved by authorized management. Suppliers obtain **reimbursable authority** from OUSD(C) annually during the budget formulation process and must maintain supporting documentation. **MIPR (Form DD 448)** is a document that customers use to place an order with a supplier, while **Acceptance of MIPR (Form DD 448–2)** is an acceptance of the order by a supplier that results in a recording of an obligation. A strong control environment around MIPRs requires that suppliers produce adequate MIPR documentation—for example, documents that spell out financial terms and conditions and a system of record to track these documents and a process in place to ensure that MIPRs are processed effectively. **Customer orders** serve a similar purpose as MIPRs for the WCF and require similar controls. **Bills** are documents that request payment from customers of costs suppliers incur. Effective controls include timely billing, adequate review that billed costs are allowable, regular accrual of unbilled costs, and signed approvals from accounting supervisors. **Payments/collections** are approvals of bills from customers, which are then sent for payment (e.g., to DFAS through the Intra-Governmental Payment and Collection system).

**Table H.3. Key Supporting Documentation for a Performing Entity**

| | | Types of KSDs Required by Each Mechanism | | | | Types of KSDs Impacting the Financial Criteria | | |
|---|---|---|---|---|---|---|---|---|
| KSDs | Business Process | Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF | Auditability | Transparency (to Customers) | Appropriateness (to Customers) |
| Forecasting and cost estimates | Anticipated reimbursements and collections | | ✓ | ✓ | ✓ | ✓[a] | ✓ | ✓ |
| Reimbursable authority | | | | ✓ | | ✓ | | |
| MIPR (Form DD 448) | MIPR (Form DD 448)[b] | | | ✓ | | ✓ | ✓ | ✓ |
| Acceptance of MIPR (Form DD 448-2) | | | | ✓ | | ✓ | ✓ | ✓ |
| Customer order | Acceptance of customer orders | | | | ✓ | ✓ | ✓ | ✓ |
| Bills | Revenue | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Payments/collections | | | | ✓ | ✓ | ✓ | ✓ | ✓ |

[a] WCF and reimbursable only. Forecasting and cost estimates are not required for auditability of direct cite/charge.
[b] Deloitte defined MIPR as a separate business process that included two related KSDs.

Table H.4 lists the eight types of KSDs required of receiving entities—that is, when an organization is receiving funding and purchasing services from vendors or employees. **Funds Authorization Document (FAD)** authorizes an organization to receive appropriations. A strong control environment requires personnel to ensure the completeness of funds and record the authorization in a system of record. **Purchase Request (Commitment Document)** is a requisition document to purchase something in the future. Effective controls require that commitments are recorded in the financial system of record and that an approver reviews and approves the document. A **Contract/Purchase Order (Obligation Document)** is the next step after a purchase request. A contract between the command and the vendor creates an enforceable agreement with a vendor. Similarly, an effective control environment requires recording the obligations into the system of record and document reviews and approvals. The final step of the contracting process produces **Contract Close Out Documentation** and ensures timely close out of completed contracts and deobligation. **Civilian pay** requires timely and accurate recording of civilian expenses. Controls include timekeeping systems, approval of time cards, and a process for accruing payroll. Commands pay **vendor invoices**, and effective controls require reviews and approvals for invoice payments and management of expenses accrued but not yet paid. The **Receiving Report for Services (DD 1155)** can potentially be part of the invoice or a separate document, managed in a similar manner. The **Appointment/Termination Record (DD 577)** designates government officials as authorized to commit and obligate funds and then accept and process payments. Controls require accuracy and approvals for the form and the existence of a system or shared drive to access the document.

**Table H.4. Key Supporting Documentation for a Receiving Entity**

| | | Types of KSDs Required by Each Mechanism | | | | Types of KSDs Impacting the Financial Criteria | | |
|---|---|---|---|---|---|---|---|---|
| KSDs | Business Process | Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF | Auditability | Transparency (to Customers) | Appropriateness (to Customers) |
| Funds authorization document (FAD) | Appropriations received | ✓ | | | | ✓ | | |
| Purchase request (commitment document) | Contract | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Contract/purchase order (obligation document) | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Contract close out documentation | Contract close out | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Civilian pay | Incurring costs/expenses | ✓ | ✓ | ✓ | ✓ | ✓ | ✓[a] | ✓[a] |
| Vendor invoice | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓[a] | ✓[a] |
| Receiving Report for Services (DD 1155) | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓[a] | ✓[a] |
| Appointment/Termination Record (DD 577) | Authorizations (for government officials) | ✓ | ✓ | ✓ | ✓ | ✓ | | |

[a] Direct cite/direct charge only. Costs and expenses incurred are more transparent to direct cite/direct charge customers who are better able to judge appropriateness because the costs are charged directly to the customers' line of accounting and recorded on their books.

Table H.5 lists the five types of KSDs required for reporting and analysis. **Reconciliation** requires personnel to ensure transactions on the general ledger are reported completely and accurately. Different funding mechanisms have different reconciliation requirements, which are discussed further below. An effective control environment requires monthly reconciliations and accounting supervisor approvals. Commands must perform a **triannual review** every four months to ensure financial transactions are valid, accurate, and complete, in accordance with the FMR.[1] **Quarterly financial statement analysis** presents a complete and accurate disclosure of financial activity. A strong control environment includes approval by authorized officials and maintenance of documentation to support the statements. **Disbursements (SF 1080 and/or SF 1034)** verifies invoiced amounts were vouchered and processed for disbursement. These actions are typically provided by service providers like the DFASs, which maintain their own controls and documentation (i.e., Service Organization Controls Report 1) for auditors. **Quarterly financial analysis** is analysis conducted within a WCF organization to monitor cash, performance, and planned versus actual spending.

[1] FMR, vol. 3 (0816).

**Table H.5. Key Supporting Documentation for Reporting and Analysis**

| | | Types of KSDs Required by Each Mechanism | | | | Types of KSDs Impacting the Financial Criteria | | |
|---|---|---|---|---|---|---|---|---|
| KSDs | Business Process | Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF | Auditability | Transparency (to Customers) | Appropriateness (to Customers) |
| Reconciliations (to the general ledger) | Reporting | ✓ | | ✓ | ✓ | ✓ | | |
| Triannual review package | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Quarterly financial statement analysis | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Disbursements (SF 1080 and/or SF 1034) | | ✓ | | ✓ | ✓ | ✓ | | |
| Quarterly Financial Analysis | Financial analysis | | | | ✓ | | | |

Table H.6 lists the two types of KSDs required for agreements with customers. The **MOA/Support Agreement (DD Form 1144)** ensures that customers and suppliers agree on conditions, requirements, terms, and scope of work. An effective control environment ensures agreements are maintained in a shared drive, retained according to retention policies, and approved by authorized approvers in the customer and supplier organizations. A **customer agreement** is a less formal agreement that would likely continue to be needed if suppliers moved to full appropriations to ensure they continued to satisfy their customers' requirements; however, it is not a formal requirement.

**Table H.6. Key Supporting Documentation for Agreements**

| | | Types of KSDs Required by Each Mechanism | | | | Types of KSDs Impacting the Financial Criteria | | |
|---|---|---|---|---|---|---|---|---|
| KSDs | Business Process | Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF | Auditability | Transparency (to Customers) | Appropriateness (to Customers) |
| Memorandum of Agreement (MOA)/ Support Agreement (DD Form 1144) | Customer terms and conditions | | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Customer agreement | Customer agreement | ✓ | | | | | ✓ | |

Finally, Table H.7 breaks out reconciliations, since the amount of reconciliations varies by funding mechanism. Table H.5 above counts reconciliations as a single type of KSD, but Table H.7 makes clear that the scope of reconciliations varies by funding model. Reimbursables and the WCF require reconciliations for transactions as both a performing entity and as a receiving entity. Appropriations, however, only require reconciliations for transactions as a receiving entity. Finally, direct cite and direct charge do not require any reconciliations by the supplier since these would be performed by the customer.

**Table H.7. Breakdown of Reconciliations Required by Each Funding Mechanism**

| Type of Reconciliation to the General Ledger | Direct Appropriations | Direct Cite/Charge | Reimbursable | WCF |
|---|---|---|---|---|
| MIPR acceptances (448-2) | | | ✓ | |
| Customer orders | | | | ✓ |
| Collections | | | ✓ | ✓ |
| Undelivered customer orders | | | ✓ | ✓ |
| Accounts receivable and revenue from the billing system | | | ✓ | ✓ |
| Commitments | ✓ | | ✓ | ✓ |
| Obligations | ✓ | | ✓ | ✓ |
| Accounts payable | ✓ | | ✓ | ✓ |
| Disbursement data | ✓ | | ✓ | ✓ |

NOTE: Reconciliations impact auditability only (see reconciliations row in Table H.5).

# Appendix I. Required Actions to Transition to Alternative Funding Models

Transitioning to an alternative funding model requires two classes of actions: establishing the systems and processes necessary to support the new model and reallocating appropriated funds to the organizations that will be paying for services under the new model. By reviewing published literature and holding discussions with representatives from RDECOM, ATEC, and the Navy,[1] we identified ten concrete actions a command would need to take to make a transition. Table I.1 lists these actions and indicates those that apply to each of the four alternative funding models. Transitioning to a WCF requires the greatest number of distinct actions, but the effort required to execute these actions depends on how similar the budgeting and accounting processes currently in place are to what would be needed under a WCF.

**Table I.1. Actions Associated with Transitioning to Alternative Funding Models**

| Transition Action | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Identify costs associated with serving each future customer | ✓ | ✓ | ✓ | ✓ |
| Identify costs covered by third-party organizations | ✓ | | | |
| Establish a depreciation schedule for current capital assets | ✓ | | | |
| Develop a cost recovery pricing methodology | ✓ | ✓ | | |
| Identify changes to budgeting and accounting requirements | ✓ | ✓ | ✓ | ✓ |
| Implement a job order accounting system | ✓ | ✓ | | |
| Prepare a charter and obtain OSD approval for a new business | ✓ | | | |
| Establish and maintain a cash corpus | ✓ | | | |
| Reallocate funding to or from future customers | ✓ | ✓ | ✓ | ✓ |
| Formulate a plan for managing demand fluctuations | ✓ | ✓ | ✓ | ✓ |

[1] We discussed transitions with the Navy after identifying personnel who experienced the transition to the NWCF. We did not discuss transitions in detail with the USAF or USACE since neither has experienced significant transitions and neither has substantial DoD WCF experience.

The remainder of this appendix describes each action in greater detail and explains how implementation may differ with the funding model adopted. The current systems and processes at RDECOM and ATEC are described in relation to each action so as to provide a rough assessment of the additional effort required to complete it. The ordering of the ten actions is discussed briefly; many of them can be done concurrently. The appendix closes by providing some insights into the time and cost associated with executing the transition actions.

## Descriptions of the Transition Actions

The overall objective of the first three actions listed in Table I.1 is to identify the costs that would need to be incorporated in the price of the service provided. The first two actions also generate the information needed to determine how appropriated funding should be reallocated to support the flow of funds under the new model. We describe each in turn.

### *Identify Costs Associated with Serving Each Future Customer*

A transition to any of the four alternative funding models requires the command attempt to identify the customers who will be served over the next two to three years[2] and estimate the direct and indirect costs associated with serving each future customer. Both the identities of the future customers and the costs of the services demanded by each must be forecast to reallocate appropriated funds properly. If the command or activity is moving away from a cost recovery model and toward a more appropriations-based funding model (from left to right across Table I.1), appropriated funds will need to be transferred from the future customers to the command. If the command or activity is moving in the reverse direction, appropriated funds will need to be transferred from the command to the future customers.

In the longer term, forecasting customer demand also supports the development of reimbursable rates used to recover indirect costs from customers. Only an estimate of total costs, broken down into direct and indirect costs, is needed for this purpose; distribution of costs across customers is only relevant during the initial reallocation of funds. However, full appropriations would still require annual forecasting of customer demand to ensure that funding across each PE is set appropriately.

Both RDECOM and ATEC already do some forecasting. RDECOM estimates demand at the customer level for a 12-month time frame; it does not generate PE-level estimates. Discussions with RDECOM indicated that 80 to 90 percent of its customer base is stable from year to year and that the total value of the services demanded by these customers can be predicted with a high degree of accuracy. However, the distribution across customers is more difficult to predict. ATEC estimates total DLHs at the customer level for a 24-month time frame. Estimates at the PE

[2] Program Objective Memorandum (POM) budgetary recommendations are usually approved by the Secretary of the Army 16 months prior to the start of the fiscal year—that is, over two years prior to the end of the fiscal year.

level are generated for only a six-month time frame. The services provided by ATEC are such that forecasting accurately beyond the next six months is challenging: Test results, which determine the need for retesting, are difficult to predict.

### *Identify Costs Covered by Third-Party Organizations*

With full cost recovery as its objective, the WCF requires indirect costs, currently covered by third-party organizations such as IMCOM, NETCOM, MEDCOM, ACC, DFAS, and Defense Information Systems Agency (DISA), be incorporated in the rates charged to customers. Costs included in the CLS are not currently tracked by either RDECOM or ATEC. The data exist but are scattered and difficult to allocate to customers. We obtained IMCOM, MEDCOM, and LRC costs through the Installation Status Report (ISR), but our estimates of ACC, DISA, and DFAS costs are based on charges to the supply management business area of the AWCF as a proportion of total revenues. More precise estimates would need to be obtained from the supplier organizations. These organizations may not have an incentive to disclose the costs they cover if such disclosure results in a reallocation of appropriated funds from the third-party organizations to RDECOM's and ATEC's customers.[3]

### *Establish a Depreciation Schedule for Current Capital Assets*

The WCF also requires depreciation of capital assets be recovered from customers. Strict adherence to the requirement would necessitate an inventory of each command's facilities and equipment, establishing depreciation schedules for the assets identified, and incorporating depreciation costs in the rates charged to customers. The services RDECOM and ATEC provide are capital intensive, requiring laboratory space, equipment, and instrumentation. Data provided by RDECOM and ATEC indicated the recorded value of their capital assets is approximately $3 billion and $1.5 billion, respectively, but financial personnel indicated these are most likely underestimates because their assets are partially recorded in their property books. Neither command systematically tracks and values the assets, but a partial inventory appears to exist in the Defense Property Accountability System and the Property Book Unit Supply Enhanced system. DoD policy prohibits WCF capital budgets from including MRTFB capital costs;[4] therefore any WCF option that maintained the MRTFB designation would not charge depreciation.

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[3] The reallocation of appropriated funds, in principal, could result in the same level of demand since customers will pay higher prices but have more appropriations to afford those higher prices. Reimbursable organizations, however, identified several reasons that such a reallocation is risky. First, there is uncertainty about future demand; thus, funding that has been reallocated to customers is no longer guaranteed. Second, if customers pay higher prices they may decrease demand; thus, the supplier's funding will decrease. Third, suppliers pointed to past reallocations where funds were taken away from suppliers but never reallocated to customers.

[4] FMR, vol. 2B (090104E1).

### *Develop a Cost Recovery Pricing Methodology*

The (near) full cost recovery and WCF models calculate and apply rates to charges for direct costs to recover indirect costs. As explained earlier in this appendix, the first three transition actions enable the rate calculations by forecasting direct costs, DLH (which will serve as the base to which the rates are applied), and indirect costs to be recovered. Under a WCF, those indirect costs include costs covered by third-party organizations and depreciation of capital assets. In practice, the development of a cost recovery pricing methodology is more likely to be iterative than sequential. An initial effort to identify and forecast the costs to be recovered may indicate that some indirect costs should be excluded from the rates and funded through appropriations instead. After setting rates for the first year, actual costs may be more or less than expected, which would inform the adjustment of rates for the following year. Both RDECOM's and ATEC's non-MRTFB activities have experience calculating indirect rates. While indirect costs at ATEC's MRTFB activities are funded by appropriations, rates are still calculated and applied to DLHs. Most of RDECOM's activities operate under a (near) full cost recovery model; accordingly, the command already forecasts costs and calculates rates.

### *Identify Changes to Budgeting and Accounting Requirements*

Transitioning to any of the alternative funding models requires identifying changes to budgeting and accounting requirements and installing the personnel, systems, and processes needed to meet the requirements. Movement toward one of the cost recovery models (from right to left across Table I.1) would require an expansion of the command's cost accounting capabilities. The expansion might include the identification and production of additional KSDs. As noted in Appendix H, the direct appropriations require only 13 KSDs to be auditable, while reimbursable funding requires 18 KSDs and a WCF requires 17 KSDs. In addition, the command may need to implement a job order accounting system or augment the functionality of an existing system to support the requisite cost accounting improvements and generation of KSDs.[5] Personnel would need to be trained to use the new system and comply with the new requirements. Movement toward the full appropriations model (from left to right across Table I.1) may permit a contraction of the command's cost accounting capabilities.

Changes to budgeting and accounting requirements should be identified early in the transition process, either before or concurrently with the cost identification and forecasting actions. Installing the personnel, systems, and processes needed to meet the requirements should follow.[6] Consideration of how the various transition actions make use of the financial accounting systems

[5] Implementation of a job order accounting system is discussed in greater detail in the next subsection.

[6] One reviewer helpfully noted outreach to customers could start once the supplier identifies changes to budgeting and accounting requirements to avoid surprises, like those when RDECOM began implementing the CONOPS.

is particularly important. The data used to prepare the KSDs and to forecast costs, for example, draw from the same systems.

### *Implement a Job Order Accounting System*

LMP is the ERP system the Army currently uses for the WCF. Presently, neither RDECOM nor ATEC makes extensive use of LMP. Our discussions with officials from the two commands indicated RDECOM uses LMP in a limited fashion to support its budgeting and accounting operations while ATEC does not use LMP. GFEBS and FIRE are the systems used primarily by RDECOM, and GFEBS and GCSS-A are the systems used primarily by ATEC. Classified programs are handled by different systems. Transitioning to the WCF would require major migrations to LMP: approximately 24,200 users for RDECOM and 6,700 users for ATEC. According to RDECOM personnel, each user would need about one day of training with financial analysts needing more.

Transitioning to a (near) full cost recovery model would not require migration to LMP. However, it may require adding functionality to GFEBS and implementing a FIRE-like system.[7] Since many of RDECOM's activities already operate under a (near) full cost recovery model, this transition applies predominantly to ATEC and those RDECOM activities that do not benefit a specific customer.

### *Prepare a Charter and Obtain OSD Approval for a New Business*

One of the final steps in the transition to a WCF is to prepare a charter and obtain OSD approval for a new business. All previous transition actions must be completed by the time the charter is submitted and approval is sought. Our discussions with officials in HQDA familiar with past changes in charters indicated that while shepherding the paperwork through the bureaucracy may be time consuming, no new personnel are required to execute this action.

### *Establish and Maintain a Cash Corpus*

The WCF receives its initial working capital through an appropriation. Our discussions with the commands indicated that this one-time infusion should amount to at least seven to ten days of the activities' operating costs. If operating costs are highly variable over time, the infusion should be larger. Once funded, the balance is maintained through customer reimbursements paid into the WCF. Hence, much of the effort associated with this transition action is in the proper calculation of rates, which is already accounted for under the "develop a cost recovery pricing methodology" action.

[7] For example, RTC uses Pro3 software for purposes similar to FIRE.

### *Reallocate Funding to or from Future Customers*

Transitioning to any of the alternative funding models requires a reallocation of appropriated funds either to or from future customers. If the command moves away from a cost recovery model and toward a more appropriations-based funding model (from left to right across Table I.1), appropriated funds must be transferred from the future customers to the command. If the command moves in the reverse direction, appropriated funds must be transferred from the command to the future customers. Commands in the (near) full cost recovery model can accept some appropriations and receive services for "free" from third-party organizations, but for a transition to the WCF, all appropriated funds[8] as well as funds from third-party organizations must be transferred to future customers. The amounts to be reallocated are determined by the forecasting actions described in the first three transition actions.

Discussions with representatives from RDECOM, ATEC, and the Navy indicated that it may take two or three iterations to reallocate funds appropriately. The initial reallocation would reflect the best available estimates, but actual costs and their distribution across customers would likely differ from those estimates. Forecasts for the following budget year would account for the new cost data and inform the next reallocation, and it may take one additional iteration to reach a state in which the margin of error is acceptable. For example, estimating costs previously covered by third-party organizations may be challenging in the first year because the commands have poor visibility into costs that fall below CLS. However, after a year of experience paying these costs from the WCF, the commands should have better estimates, which would be reflected in the reallocations for the following year.

### *Formulate a Plan for Managing Demand Fluctuations*

Transitioning to any of the funding models will affect the prices paid by customers. An increase in the use of appropriations to cover the cost of providing services reduces the prices paid directly by customers. Moving toward full cost recovery, on the other hand, raises the prices customers pay. In either case, a demand response may ensue, particularly if a similar service is available from another provider. Greater use of appropriations may result in a demand increase; if demand exceeds capacity, the command must implement a mechanism for rationing the service. An increase in rates aimed at recovering a greater share of costs from customers may result in a demand reduction; if indirect costs are distributed over a workload that gets progressively smaller, rates will continue to increase, and a death spiral may ensue.

As the command reaches full implementation of the alternative funding model chosen, it may need to formulate a plan for managing such fluctuations in demand. Our discussions with the Navy revealed that some activities were not able to survive under the NWCF. These activities

[8] For example, RDECOM's S&T appropriations would need to be reallocated to customers. In the Navy, the Office of Naval Research serves as the customer for S&T activities.

were shut down with the Navy subsequently obtaining the service from a different provider. While such closures may be unfavorable from the command's perspective,[9] they may be efficient from an Army-wide point of view.

## Time and Cost Associated with the Transition Actions

We close this appendix by providing a few insights into the time and cost associated with executing the transition actions described above. Our discussions with RDECOM and ATEC suggested the full transition process would likely take two to four years. This time frame includes one or two iterations in which adjustments are made in response to the experience of operating under the new funding model. Given the additional actions required, transitioning to a WCF would be more time intensive, putting the transition period at closer to three or four years; this is consistent with the Navy's experience. Transitioning to a non-WCF model (e.g., transferring RDECOM from [near] full cost recovery to appropriations for indirect costs) may take only two years because these models are similar to the current model and the command could continue operating within GFEBS.

Much of the effort needed to transition to an alternative funding model is associated with identifying and estimating future costs (the first three transition actions) and achieving compliance with budgeting and accounting requirements (the fifth and sixth transition actions). Accordingly, these actions are likely the primary cost drivers. The remainder of this section explores these costs.

### *Costs Associated with Identifying and Estimating Future Costs*

As explained above, both RDECOM and ATEC already do some forecasting. We were not able to determine exactly how many analysts in each command are engaged in cost estimating and budget planning specifically, but we were able to obtain the civilian TDA data presented in Table I.2, which indicate that the number of civilian personnel in accounting, budgeting, and financial occupations is approximately 200 for RDECOM and 150 for ATEC. These figures do not reflect contract support, which may be performing similar or related functions. Our discussions with officials from the two commands indicated existing personnel may be able to carry the additional effort associated with the first three transition actions. Assistance from short-term contract support may be required for transitions toward full cost recovery (moving from

[9] For example, officials at RDECOM thought that decreases in demand due to WCF pricing may necessitate new laws and policies to maintain workload at RDECOM and avoid divestment of activities, as occurred in the Navy. DoD depots, which are WCF-funded, provide an example where Congress enacted policy measures to maintain demand despite higher WCF prices. The "50/50 rule" (10 U.S.C. 2466) requires at least 50 percent of depot maintenance funds be used within DoD and the core logistics capability rule (10 U.S.C. 2464) requires minimum workloads to maintain capabilities at depots. If RDECOM moved to the WCF model, they would likely advocate for similar policy measures to protect their capabilities.

right to left across Table I.1). These discussions with the commands are consistent with the experiences reported in our discussions with the Navy: we were told the 1994 migration of activities to the Navy WCF did not require permanent additions to personnel but did require temporary support for about two years. However, the Navy cautioned that augmenting the workloads of existing personnel resulted in a reprioritization such that some older tasks were displaced by the new work.

**Table I.2. FY 2017 Civilian Authorizations in Accounting, Budgeting, and Financial Occupations**

| | RDECOM | ATEC |
|---|---|---|
| Accounting | 42 | 18 |
| Accounting technician | 2 | 2 |
| Budget analysis | 113 | 91 |
| Budget clerical and assistance | 2 | 1 |
| Financial administration/Program specialist | 40 | 40 |
| Financial management technician | 1 | 0 |
| Financial manager | 3 | 1 |
| **Total** | **203** | **153** |

SOURCE: FY 2017 TDAs from Force Management System Web Site (FMSWeb), accessed on April 2, 2018.

To quantify the costs associated with the first three transition actions, the Army must identify how many individuals are currently engaged in cost estimating and budget planning specifically and determine whether they possess the requisite skills and bandwidth to execute the new work. The latter requires an examination of the tasks these individuals are currently executing and an assessment of whether less effort can be devoted to some of them. If, in fact, the additional cost estimating and budget planning work can be absorbed by existing personnel over the long term, then the enduring costs associated with the first three transition actions may be inconsequential. The transitory costs would be driven primarily by contract support during the two- to four-year transition period.

### *Costs Associated with Achieving Compliance with Budgeting and Accounting Requirements*

As explained earlier, a transition toward one of the cost recovery models would require an expansion of the command's cost accounting capabilities and might include the identification and production of additional KSDs, the implementation of a job order accounting system, and the provision of training. Since the WCF requires more detailed cost accounting and a migration to LMP, we focus the discussion on this alternative.

We were not able to determine whether the additional accounting workload could be absorbed by existing personnel or would require a permanent expansion of the command's

accounting workforce. In our discussions, the Navy reported that additional support was needed during the transition period only, but we did not seek to verify the assertion with data. The data in Table I.2 indicate that RDECOM's accounting workforce is only twice as large as ATEC's; in contrast, RDECOM's total personnel head count is over three times as large as ATEC's. These ratios may be an indication the need for accounting personnel does not scale linearly with workload.

We were also unable to estimate the cost of an LMP migration to support the WCF for either of the two commands. To get a sense for what the costs might be, we examined the costs of previous Army LMP implementations. Table I.3 presents a breakdown of the costs for LMP Increment 2, which seemed to be most similar to the implementation that would be required for RDECOM or ATEC. LMP's business case for Increment 2 stated that the current system needed additional functionality to support certain critical requirements. Similarly, the implementation of LMP within RDECOM or ATEC to support the WCF would likely include the development of additional functionality.

**Table I.3. Army LMP Increment 2 Cost Estimates by Wave and by Phase ($Millions)**

| | Wave 1 | Wave 2 | Wave 3 |
|---|---|---|---|
| Tasks | • ERP Integration and Reengineering | • ERP Integration and Reengineering<br>• NAMI<br>• APS | • NMP<br>• Extended Ammunition Management Capability<br>• EIB |
| Phase | | | |
| Design | 36 | 36 | 52 |
| Build | 15 | 25 | 60 |
| T&E | 10 | 30 | 45 |
| Final prep | | 28 | 91 |
| Go-live & support | | 12 | 12 |
| **Total** | **61** | **131** | **260** |

SOURCES: RAND Arroyo Center analysis of Program Executive Office Enterprise Information Systems (2013); U.S. Government Accountability Office, "Defense Logistics: Army Should Track Financial Benefits Realized from Its Logistics Modernization Program," Washington, D.C.: GAO-14-51, November 2013.
NOTES: Using the sources above, RAND Arroyo Center estimated that the design phase costs $4 million per month; the build and T&E phase cost $5 million per month; and the final prep and go-live & support phase costs $7 million per month. Total costs were estimated by multiplying scheduled months for each phase by these factors. NAMI = Non-Army managed items: Controlling and maintaining visibility over material managed by non-Army sources of supply; APS = Additional capability to manage Army prepositioned stocks; NMP = national maintenance program: Managing repair operations at Army installations; EIB = expanded industrial base: Tracking repair and manufacturing operations on the shop floor.

Table I.3 puts the total cost of implementing all three waves at $452 million. Sustainment costs, which are not included in the table, were estimated to be about $270 million for 14,000

users over ten years.[10] Applying these sustainment costs to ATEC's 6,700 users and RDECOM's 24,200 users yields estimates of $13 million and $46 million per year, respectively.

Training is an important component of any ERP implementation. It typically occurs during the build phase with the number of training hours depending on the transaction volume the user will be executing. The estimates presented in Table I.3 include training costs (training typically occurs in the "build" phase but can also occur in the "T&E" phase), but we were not able to break them out. The Gartner group and IDC Learning Services reported that, on average, 15 percent of the total ERP budget is spent on training.[11]

A more constructive approach to estimating training costs might assume each user would need about two hours of basic training plus six hours of specialized training to perform their job functions. The cost of this training for RDECOM's 24,200 users, assuming average hourly compensation of $84 per hour, is $16.3 million (see Table I.4); the cost for ATEC's 6,700 users, assuming average hourly compensation of $67 per hour, is $3.6 million. Accounting, budgeting, and financial personnel may require additional training. Our discussions with RDECOM officials indicated the average analyst received about 300 hours of training for the 2012 migration to GFEBS. An additional 300 hours of training for each of RDECOM's 200 analysts at a rate of $70 per hour would cost the command about $4.2 million; the analogous calculation for ATEC's 150 analysts yields $3.2 million. These back-of-the-envelope calculations put the one-time cost of training at approximately $20 million for RDECOM and $7 million for ATEC.

**Table I.4. Estimates of Training Costs for RDECOM and ATEC Conversion to WCF**

| | RDECOM | ATEC |
|---|---|---|
| All users | 24,200 | 6,700 |
| Avg. hourly compensation | $84 | $67 |
| Hours of training | 8 | 8 |
| Total: All users | $16.3M | $3.6M |
| Financial analysts | 200 | 150 |
| Avg. hourly compensation | $70 | $70 |
| Hours of training | 300 | 300 |
| Total: Financial analysts | $4.2M | $3.2M |
| Total training cost | $20.5M | $6.7M |

SOURCE: Calculations based on inputs suggested by RDECOM and ATEC during conversations about transition costs.

[10] Increment 2 added 9,000 new users and provided 5,000 existing users with additional functionality. See U.S. Army, Program Executive Office Enterprise Information Systems, Program Executive Office Enterprise Information Systems, "Logistics Modernization Program (LMP): Increment 2 Overview," Fort Belvoir, Va.: U.S. Army PE EIS, May 2017.

[11] See Axel Purr, "5 Tips: How to Plan Training for Your ERP Implementation," *Oracle University Blog*, August 26, 2015.

We close this appendix by noting that, if there is a general trend toward more stringent auditability requirements, the commands may find themselves conducting more detailed cost accounting independent of the funding model chosen. In this scenario, the *marginal* cost associated with moving toward full cost recovery would be smaller, even if the total cost remained the same.

# Appendix J. Price Impact Calculations

We estimated potential price changes under each of the alternatives based on data provided by RDECOM and ATEC as well as AWCF budget materials for the supply management and industrial operations business areas and information about additional third-party charges from AMC and the ISR. The resulting estimates are shown in Table J.1 for RDECOM and Table J.2 for ATEC and are based on FY 2016 data unless otherwise noted.[1] Non–FY 2016 costs have not been adjusted.[2] All costs are expressed as command-wide averages per DLH. ATEC provided an extract from GFEBS, so we classified most costs into the same categories presented in the AWCF budget materials. RDECOM provided more aggregated cost data that was classified into direct and indirect labor and nonlabor costs. Another key distinction is that ATEC tracks reimbursable labor hours for contractor employees, so ATEC's civilian personnel costs include both contractor and Army civilian labor. RDECOM does not track contractor labor hours, so we excluded direct and reimbursable contract costs from our indirect rate calculations, which would apply only to labor provided by Army personnel. The exclusion of contract costs from the indirect rate calculations assumes that direct contract costs would be funded directly by customers through direct cite, which is similar to practices across DoD labs. However, indirect contract costs are funded by the commands and thus included in indirect cost rates.

Additional data sources used in Tables J.1 and J.2 are as follows:

- Military personnel are identified by pay grade from organizational TDA and costed based on FY 2018 DoD Military Personnel Composite Standard Pay and Reimbursement Rates.
- Depreciation rates are based on 10 percent of the value of capital assets provided by RDECOM and ATEC.[3]

[1] Most of the costs included in the analysis are paid by RDECOM and ATEC, who supplied the study team with FY 2016 costs. The commands do not have visibility into costs they currently do not pay (i.e., most of the costs that are included in the WCF columns but not in the other columns), so a variety of sources of data, vintages of data, and assumptions were used to gather evidence of the potential size of the costs the commands could pay.

[2] Due to a lack of data about how these costs have changed over time, we have not attempted to adjust the non–FY 2016 cost estimates to FY 2016. These estimates have a high degree of uncertainty relative to the costs that the commands paid in FY 2016. We discuss these issues in more detail at the end of this appendix chapter.

[3] DoD permits only straight-line depreciation for nonmilitary equipment (FMR, vol. 4 [060205C])—that is, a piece of equipment with a ten-year useful life would be depreciated for 10 percent of its value over ten years. Table 6–1 in FMR, vol. 4, lists the useful life for a variety of assets (e.g., computers assume a useful life of five years while buildings assume a useful life of 40 years). Our assumption of a 10-percent depreciation rate assumes an average useful life of ten years, which is the default useful life for equipment in Table 6–1. Consequently, depreciation is a rough estimate. An accurate calculation of depreciation would require asset-level calculations of depreciation.

  - DoD policy currently prohibits MRTFBs from including MRTFB investments in WCF capital budgets.[4] Therefore, the calculations in this appendix list depreciation separately or list two calculations, one with and one without depreciation.

- LMP sustainment costs are based on a figure of $1,900 per user, which is derived from budgeted sustainment costs presented in a GAO report.[5]
- Audit readiness, ACC, DFAS, and DISA costs are calculated as a percentage of total revenues and are based on FY 2018 costs budgeted or charged to the supply management business area of the AWCF.
- IMCOM, NETCOM, MEDCOM, and Logistics Readiness Center costs are attributed based on the number of personnel employed by ATEC or RDECOM at each installation as a percentage of total supported personnel, using FY 2016 data from the ISR for IMCOM and MEDCOM costs, FY 2012 data for Logistics Readiness Center costs, and FY 2010 data for NETCOM costs.[6]
- We were not able to find a source for data on Army Civilian Human Resources Agency (CHRA) costs.
- Recurring transition costs other than LMP sustainment are not included in these estimates.

Currently, RDECOM recovers indirect costs based on rates applied to direct civilian labor hours, but in FY 2016 it also managed $1.9 billion in direct contracts and $1.4 billion in reimbursable contracts. If its indirect costs were spread equally over both organic and contractor workload, charges for organic workload could be reduced considerably.[7] For example, we estimated average indirect rates would be reduced from a command-wide average of $29.07 per DLH to $11.92 per DLH, and indirect RDECOM headquarters costs would be reduced from $1.52 to $0.62 per DLH. However, RDECOM would have to charge a markup of approximately 11.3 percent on contract costs to recover indirect RDECOM costs and 0.6 percent to recover indirect RDECOM headquarters costs. In practice, indirect costs would need to be allocated more precisely based on whether they support organic or contractor workload or both,[8] so would likely lie somewhere between these two end points.

[4] FMR, vol. 2B (090104E1).

[5] U.S. Government Accountability Office, "Defense Logistics: Army Should Track Financial Benefits Realized from Its Logistics Modernization Program," Washington, D.C.: GAO-14-51, November 2013.

[6] As functions migrated from IMCOM Directorates of Logistics and Information Management to AMC and NETCOM, respectively, these costs were no longer recorded as ISR Services costs.

[7] Improvement #8 in Chapter 6 suggests that RDECOM should apply indirect rates to contractor support.

[8] Some portion of RDECOM's contracts pays for contract support personnel, while some portion pays for pass-through funding to external contractors, which likely imposes fewer indirect costs, thus warranting lower indirect rates.

**Table J.1. Comparison of Estimated Alternative Prices per DLH for RDECOM**

| | WCF | (Near) Full Cost Recovery (Status Quo) | Appropriations for Indirect Costs |
|---|---|---|---|
| Civilian personnel compensation and benefits | $84.40 | $84.40 | $84.40 |
| Military personnel compensation and benefits | $1.25 | | |
| Direct nonlabor costs | $20.72 | $20.72 | $20.72 |
| Indirect costs | $29.07 | $29.07 | |
| Section 219 tax | $2.66 | $2.66 | $2.66 |
| Indirect HQ RDECOM costs | $1.52 | | |
| Depreciation—capital | $7.18 | | |
| LMP sustainment | $2.24 | | |
| Audit readiness | $0.21 | | |
| Possible third-party charges | | | |
| IMCOM | $8.86 | | |
| NETCOM | $0.57 | | |
| MEDCOM | $0.48 | | |
| ACC | $0.25 | | |
| DFAS | $0.11 | | |
| DISA | $0.02 | | |
| CHRA | N/A | | |
| Logistics Readiness Centers | $0.77 | | |
| **Total** | **$160.32** | **$136.85** | **$107.78** |

SOURCES: Military personnel: identified by pay grade from organizational TDA and costed based on FY 2018 DoD Military Personnel Composite Standard Pay and Reimbursement Rates.
Depreciation: based on 10 percent of the value of capital assets provided by RDECOM and ATEC.
LMP sustainment: $1,900 per user based on GAO (2013).
Audit readiness, ACC, DFAS, and DISA costs assume that RDECOM would pay the same percentages of its revenues for these costs as AMC's supply management business area (whose costs were provided by AMC and whose FY 2018 revenue is from the FY 2019 President's Budget).
IMCOM, NETCOM, MEDCOM, Logistics Readiness Center: Installation Status Report (FY 2016 data for IMCOM and MEDCOM costs, FY 2012 data for Logistics Readiness Center costs, and FY 2010 data for NETCOM costs).
Not included: CHRA costs, recurring costs other than LMP sustainment.
Internal costs are based primarily on FY 2016 data provided by RDECOM on June 16, 2017, September 15, 2017, and December 18, 2017.
NOTES: DLH = direct labor hour; LMP = Logistics Modernization Program; IMCOM = Army Installation Management Command; NETCOM = Army Network Enterprise Technology Command; MEDCOM = Army Medical Command; ACC = Army Contracting Command; DFAS = Defense Finance and Accounting Service; DISA = Defense Information Systems Agency; CHRA = Army Civilian Human Resources Agency.

**Table J.2. Comparison of Estimated Alternative Prices per DLH for ATEC**

| | MRTFB | | | Non-MRTFB (RTC) | | |
|---|---|---|---|---|---|---|
| | WCF[a] | (Near) Full Cost Recovery[a] | Approp. for Indirect Costs (Status Quo) | WCF[a] | Near Full Cost Recovery (Status Quo) | Approp. for Indirect Costs |
| Civilian personnel compensation and benefits | $82.10 | $82.10 | $48.52 | $70.78[a] | $55.60 | $55.58 |
| Military personnel compensation and benefits | $2.10 | | | $3.83 | | |
| Travel and transportation of personnel | $2.10 | $2.10 | $0.72 | $1.29 | $0.85 | $0.85 |
| Material and supplies | $7.08 | $7.08 | $1.51 | $11.91 | $6.26 | $6.26 |
| Equipment | $4.99 | $4.99 | $0.36 | $0.78 | $0.39 | $0.39 |
| Other purchases from revolving funds | $2.45 | $2.45 | $0.92 | $15.51 | $2.07 | $2.06 |
| Transportation of things | $0.31 | $0.31 | $0.11 | $0.96 | $0.00 | $0.00 |
| Printing and reproduction | $0.08 | $0.08 | $0.00 | $0.00 | $0.00 | $0.00 |
| Advisory and assistance services | $7.04 | $7.04 | $1.13 | $9.33 | $1.53 | $1.50 |
| Rent, communications, utilities, and miscellaneous charges | $1.67 | $1.67 | $0.11 | $0.47 | $0.00 | $0.00 |
| Other purchased services | $36.77 | $36.77 | $8.25 | $46.09 | $18.00 | $17.90 |
| Indirect cost transfers | $0.02 | $0.02 | | $0.02 | $43.06[b] | |
| Depreciation—capital | $41.45 | | | $42.52 | | |
| Headquarters costs | $7.58 | | | $8.24 | | |
| LMP sustainment | $2.26 | | | $1.37 | | |
| Audit readiness | $0.22 | | | $0.24 | | |
| Possible third-party charges | | | | | | |
| IMCOM | $15.06 | | | $3.89 | | |
| NETCOM | $1.17 | | | $0.07 | | |
| MEDCOM | $1.59 | | | $0.19 | | |
| ACC | $0.27 | | | $0.29 | | |
| DFAS | $0.11 | | | $0.12 | | |
| DISA | $0.02 | | | $0.02 | | |
| CHRA | N/A | | | N/A | | |
| Logistics Readiness Centers | $1.59 | | | $0.37 | | |
| **Total** | **$218.03** | **$144.60** | **$61.63** | **$218.29** | **$127.76** | **$84.54** |

SOURCES: Military personnel: identified by pay grade from organizational TDA and costed based on FY 2018 DoD Military Personnel Composite Standard Pay and Reimbursement Rates.
Depreciation: based on 10 percent of the value of capital assets provided by RDECOM and ATEC.
LMP sustainment: $1,900 per user based on GAO (2013).
Audit readiness, ACC, DFAS, and DISA costs assume that ATEC would pay the same percentages of its revenues for these costs as AMC's supply management business area (whose costs were provided by AMC and whose FY 2018 revenue is from the FY 2019 President's Budget).
IMCOM, NETCOM, MEDCOM, Logistics Readiness Center: Installation Status Report (FY 2016 data for IMCOM and

MEDCOM costs, FY 2012 data for Logistics Readiness Center costs, and FY 2010 data for NETCOM costs).
Not included: CHRA costs, recurring costs other than LMP sustainment.
Internal costs are primarily based on FY 2016 data from GFEBS provided by ATEC on June 16, 2017.
NOTES:
[a] These estimates include both direct and indirect costs in each category.
[b] Indirect cost transfers for reimbursable workload are distributed to individual cost categories in WCF price estimates using GFEBS data for all RTC workload.
ATEC prices exclude AEC and OTC. For simplicity, we assume that all costs at test centers other than RTC are in the MRTFB. DLH = direct labor hour; LMP = Logistics Modernization Program; IMCOM = Army Installation Management Command; NETCOM = Army Network Enterprise Technology Command; MEDCOM = Army Medical Command; ACC = Army Contracting Command; DFAS = Defense Finance and Accounting Service; DISA = Defense Information Systems Agency; CHRA = Army Civilian Human Resources Agency.

We anticipate that, under a WCF alternative, the prices of individual test capabilities or engineering services could vary considerably, depending on factors such as differences in average compensation costs, indirect costs, capital assets, and third-party charges at each test center or RDEC. To explore these differences, we estimated average WCF prices per DLH for each RDEC (shown in Table J.3) and each MRTFB test center (shown in Table J.4).

**Table J.3. Comparison of Estimated WCF Prices per DLH for Each RDEC**

| | RDECOM Average | AMRDEC | ARDEC | ARL | CERDEC | ECBC | NSRDEC | TARDEC |
|---|---|---|---|---|---|---|---|---|
| Civilian personnel compensation and benefits | $84.40 | $89.90 | $80.35 | $87.19 | $87.95 | $79.27 | $74.34 | $79.33 |
| Military personnel compensation and benefits | $1.25 | $1.03 | $1.01 | $1.79 | $1.60 | $0.61 | $2.57 | $0.98 |
| Direct nonlabor costs | $20.72 | $16.26 | $18.53 | $29.07 | $8.44 | $52.20 | $23.68 | $19.48 |
| Indirect costs | $29.07 | $17.87 | $33.56 | $40.26 | $ 23.10 | $39.81 | $39.56 | $25.97 |
| Section 219 tax | $2.66 | $0.48 | $3.80 | $9.20 | $0 | $2.45 | $2.74 | $0 |
| Indirect HQ RDECOM costs | $1.52 | $1.52 | $1.52 | $1.52 | $1.52 | $1.52 | $1.52 | $1.52 |
| Depreciation—capital | $7.18 | $4.60 | $2.46 | $13.13 | $12.58 | $14.97 | $5.98 | $2.65 |
| LMP sustainment | $2.24 | $3.74 | $1.57 | $1.93 | $3.06 | $1.73 | $1.74 | $1.69 |
| Audit readiness | $0.21 | $0.19 | $0.21 | $0.26 | $0.19 | $0.27 | $0.22 | $0.19 |
| Possible third-party charges | | | | | | | | |
| IMCOM | $8.86 | $10.46 | $10.30 | $6.73 | $9.26 | $8.33 | $10.03 | $4.95 |
| NETCOM | $0.57 | $0.18 | $1.73 | $0.37 | $0.21 | $0.17 | $0.06 | $0.16 |
| MEDCOM | $0.48 | $2.10 | $0.79 | $0.20 | $0.40 | $0.43 | $0.05 | $0.53 |
| ACC | $0.25 | $0.23 | $0.25 | $0.31 | $0.22 | $0.32 | $0.26 | $0.23 |
| DFAS | $0.11 | $0.10 | $0.11 | $0.13 | $0.10 | $0.14 | $0.11 | $0.10 |
| DISA | $0.02 | $0.02 | $0.02 | $0.02 | $0.01 | $0.02 | $0.02 | $0.02 |
| CHRA | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Logistics Readiness Centers | $0.77 | $0.99 | $0.82 | $0.61 | $0.67 | $0.57 | $1.05 | $0.60 |
| **Total** | **$160.32** | **$149.56** | **$157.03** | **$192.71** | **$149.31** | **$202.80** | **$163.91** | **$138.39** |

SOURCES: See Table J.1.
NOTES: Price estimates are based primarily on FY 2016 data.
DLH = direct labor hour; LMP = Logistics Modernization Program; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; ARL = Army Research Laboratories; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center; IMCOM = Army Installation Management Command; NETCOM = Army Network Enterprise Technology Command; MEDCOM = Army Medical Command; ACC = Army Contracting Command; DFAS = Defense Finance and Accounting Service; DISA = Defense Information Systems Agency; CHRA = Army Civilian Human Resources Agency.

**Table J.4. Comparison of Estimated WCF Prices per DLH for Each MRTFB Test Center**

| | MRTFB Average | ATC | EPG | WDTC | WSTC | YTC |
|---|---|---|---|---|---|---|
| Civilian personnel compensation and benefits | $82.10 | $92.34 | $69.07 | $62.58 | $113.05 | $63.54 |
| Military personnel compensation and benefits | $2.10 | $1.30 | $9.09 | $0.58 | $1.06 | $1.94 |
| Travel and transportation of personnel | $2.10 | $1.48 | $2.34 | $1.43 | $1.76 | $3.09 |
| Material and supplies | $7.08 | $9.69 | $2.97 | $7.77 | $3.50 | $8.34 |
| Equipment | $4.99 | $2.46 | $6.12 | $5.80 | $8.11 | $4.28 |
| Other purchases from revolving funds | $2.45 | $0.03 | $0.02 | $5.24 | $7.07 | $0.91 |
| Transportation of things | $0.31 | $0.33 | $0.02 | $0.29 | $0.21 | $0.46 |
| Printing and reproduction | $0.08 | $0.00 | $0.04 | $0.00 | $0.38 | $0.00 |
| Advisory and assistance services | $7.04 | $9.79 | $1.45 | $12.13 | $8.15 | $3.45 |
| Rent, communications, utilities, and miscellaneous charges | $1.67 | $0.38 | $0.02 | $1.94 | $5.92 | $0.21 |
| Other purchased services | $36.77 | $32.10 | $42.61 | $34.43 | $47.67 | $32.27 |
| Indirect cost transfers | $0.02 | –$0.08 | –$0.54 | $0.01 | $0.27 | $0.10 |
| Depreciation—capital | $41.45 | $41.22 | $36.60 | $28.68 | $37.86 | $51.19 |
| Headquarters costs | $7.58 | $7.79 | $6.51 | $6.90 | $10.28 | $6.11 |
| LMP sustainment | $2.26 | $2.34 | $2.55 | $2.28 | $2.97 | $1.59 |
| Audit readiness | $0.22 | | $0.19 | $0.20 | $0.30 | $0.18 |
| Possible third-party charges | | | | | | |
| IMCOM | $15.06 | $11.07 | $14.03 | $34.28 | $15.58 | $10.39 |
| NETCOM | $1.17 | $0.26 | $3.21 | $0.09 | $3.57 | $0.07 |
| MEDCOM | $1.59 | $0.47 | $1.54 | $4.00 | $1.71 | $1.50 |
| ACC | $0.27 | $0.27 | $0.23 | $0.24 | $0.36 | $0.21 |
| DFAS | $0.11 | $0.12 | $0.10 | $0.10 | $0.15 | $0.09 |
| DISA | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.01 |
| CHRA | N/A | N/A | N/A | N/A | N/A | N/A |
| Logistics Readiness Centers | $1.59 | $0.81 | $1.96 | $1.32 | $2.18 | $1.85 |
| **Total** | **$218.03** | **$214.43** | **$200.15** | **$210.28** | **$272.15** | **$191.83** |

SOURCES: See Table J.2.
NOTES: Price estimates are primarily based on FY 2016 data. ATEC prices exclude AEC and OTC. For simplicity, we assume that all costs at test centers other than RTC are in the MRTFB.
DLH = direct labor hour; LMP = Logistics Modernization Program; ATC = Aberdeen Test Center; EPG = Electronic Proving Ground; WDTC = West Desert Test Center; WSTC = White Sands Test Center; YTC = Yuma Test Center; IMCOM = Army Installation Management Command; NETCOM = Army Network Enterprise Technology Command; MEDCOM = Army Medical Command; ACC = Army Contracting Command; DFAS = Defense Finance and Accounting Service; DISA = Defense Information Systems Agency; CHRA = Army Civilian Human Resources Agency.

## Customer Responses to Price Changes

As Tables J.1 and J.2 indicate, we estimate that a transition to a WCF would result in about a 17-percent increase in the average prices charged by RDECOM, with the largest increases coming from depreciation charges and potential cost transfers from IMCOM. RDECOM's average prices would fall by about 20 percent if indirect costs were funded by appropriations. We estimate the average prices for the MRTFBs would increase dramatically under either (near) full cost recovery (more than a 100-percent increase) or a WCF (about a 250-percent increase). Inclusion of indirect costs affects most cost categories, particularly civilian personnel costs and purchased services. The largest additional costs that would need to be included in WCF prices are capital depreciation, headquarters costs, and potential cost transfers from IMCOM. We estimate RTC would face a 70-percent average price increase under a WCF for similar reasons. Under appropriations for indirect costs, average prices would fall by about a third.

We explored a range of potential customer responses to changes in prices based on notional elasticities of demand.[9] Table J.5 summarizes estimated price changes under each alternative model across three different assumptions about how price increases will decrease demand.

**Table J.5. Potential Effects of Price Changes per DLH on Customer Demand**

| | FY 2016 Demand DLH (1,000s) | % Change in Price | Inelastic Demand DLH (1,000s) | Revenue Neutral DLH (1,000s) | Elastic Demand DLH (1,000s) |
|---|---|---|---|---|---|
| RDECOM | 24,236 | | | | |
| WCF | | +17% | 22,394 | 20,688 | 19,102 |
| Appropriations for indirect costs | | −21% | 27,297 | 30,772 | 34,750 |
| Full appropriations | | −100% | Demand unconstrained by customer cost | | |
| ATEC MRTFBs | 5,588 | | | | |
| WCF | | +254% | 3,146 | 1,580 | 490 |
| WCF (No depreciation) | | +187% | 3,416 | 1,950 | 895 |
| (Near) full cost recovery | | +135% | 3,716 | 2,382 | 1,382 |
| Full appropriations | | −100% | Demand unconstrained by customer cost | | |
| ATEC Non-MRTFB (RTC) | 1,233 | | | | |
| WCF | | +71% | 948 | 722 | 538 |
| Appropriations for indirect costs | | −34% | 1,512 | 1,863 | 2,317 |
| Full appropriations | | −100% | Demand unconstrained by customer cost | | |

SOURCES: RAND Arroyo Center analysis of ATEC, RDECOM, AWCF, and AMC data (see Tables J.1 and J.2).

[9] The arc elasticity of demand is defined as the percentage change in quantity divided by the percentage change in price, calculated at the midpoint of the old price and the new price.

Actual customer responses will depend on the availability of alternative sources for the services provided by RDECOM and ATEC, the prices charged by these alternative suppliers, and the value of the service to customers relative to the price. In addition, if funding was previously provided as appropriations to the supplier organizations is reallocated to Army customers, then customers' increased budgets could potentially dampen the effects of price changes, although there is no guarantee that Army customers would spend the additional funding on RDECOM and ATEC services, particularly as memories faded on the reasons for the shift in funding.

The baseline case is an elasticity of −1, which is revenue neutral (i.e., the old price multiplied by the old quantity is equal to the new price multiplied by the new quantity). Table J.5 also includes cases where demand is less elastic (elasticity of −0.5)—that is, customers do not have alternative sources of supply or they receive additional funding to pay the higher prices—and where demand is more elastic (elasticity of −1.5)—that is, customers are able to shift their demand to less expensive suppliers. If demand is more elastic than −1, the supplier organization's total revenues would fall when prices increase, resulting in a loss under the WCF model and future price increases to cover those losses.

In the case of full appropriations, demand would be constrained by supplier capacity and funding instead of customer price considerations, and supplier organizations would need to develop mechanisms to allocate capacity among customers. (Near) full cost recovery or WCF pricing could result in significant price increases, particularly for the MRTFBs. Changes in workload for individual capabilities or services would depend on the uniqueness of the capability and its importance to the customer. In addition, non-Army customers would not receive reallocated funding to pay higher prices, so their demand might be more elastic than that of Army customers. Currently, ATEC receives about 30 percent of its revenues from non-Army customers. Of these, about 11 percent are non-DoD customers who already pay some indirect charges. In contrast, only about 5 percent of RDECOM's workload is for non-Army customers.

Table J.6 provides a summary of the previous tables to show how prices would change under alternative funding models and how customer demand would change if customers were revenue neutral. Price changes for RDECOM are relatively small compared with those for ATEC because ATEC has relatively larger indirect costs and capital/depreciation costs. An important caveat to this analysis is that estimated price changes do not consider the second-order impacts from changes in demand. Assuming RDECOM's and ATEC's indirect costs remain steady, any changes in demand would impact customer prices in (near) full cost recovery because indirect costs would need to be collected over a different base of DLH and would create NOR losses that would require recovery from future WCF customers. Although rebalancing appropriations to RDECOM's and ATEC's customers could potentially dampen the impact on demand, there is a potential that the process of escalating prices and depressed demand could lead to "death spirals," especially if the commands were unable to reduce their indirect costs.

**Table J.6. Summary of Potential Effects of Price Changes per DLH on Customer Demand in DLH for a Revenue-Neutral Elasticity**

| | FY 2016 Average Price | Average Price in Alternative | % Change in Price | FY 2016 Demand DLH (1,000s) | Revenue-Neutral DLH (1,000s) |
|---|---|---|---|---|---|
| RDECOM | $136.85 | | | 24,236 | |
| WCF | | $160.32 | +17% | | 20,688 |
| Appropriations for indirect costs | | $107.78 | −21% | | 30,772 |
| Full appropriations | | $0 | −100% | | N/A |
| ATEC MRTFBs | $63.28 | | | 5,588 | |
| WCF | | $218.03 | +254% | | 1,580 |
| WCF (No depreciation) | | $176.58 | +187% | | 1,950 |
| (Near) full cost recovery | | $144.60 | +135% | | 2,382 |
| Full appropriations | | $0 | −100% | | N/A |
| ATEC Non-MRTFB (RTC) | $127.76 | | | 1,233 | |
| WCF | | $218.29 | +71% | | 722 |
| Appropriations for indirect costs | | $84.54 | −34% | | 1,863 |
| Full appropriations | | $0 | −100% | | N/A |

SOURCES: Summary of Tables J.1, J.2, and J.4.

## Data Reliability

Commands have the most visibility into the costs they currently expend; thus the majority of costs identified in Tables J.1–J.4 are highly reliable because they are based on FY 2016 cost data as reported by RDECOM and ATEC.

However, there are several sources of uncertainty. First, these estimates are based on historic data; thus, changes in workload and costs can impact future prices. Second, DLH could vary under alternative models if the commands' DLH definition changes. In the TARDEC example provided earlier, TARDEC was improperly labeling indirect activities as direct. DLH will fall, and average prices will increase (all else being equal), if activities are shifted from direct to indirect. On the other hand, in our discussions with the Navy we learned that contracting activities RDECOM considers indirect (i.e., managing direct cite contracts for customers) are usually considered direct in the Navy WCF, which would have the opposite impact on DLH and average prices. Finally, additional costs that would need to be recovered by the WCF have a high level of uncertainty. Both RDECOM and ATEC indicated that the estimates of capital assets they provided most likely excluded some assets that are not recorded on their property books. In addition, we did not have information on the expected useful life of capital assets, which would affect actual depreciation rates. Our estimated depreciation charges could be too low to the extent that some capital assets are excluded or too high to the extent that some assets are either fully depreciated or have a useful life longer than 10 years. Costs from third-party providers like IMCOM are subject to negotiation. The actual costs paid would likely be based on more precise calculations than the estimates in this report.

# Appendix K. Use Cases

As mentioned in Chapter 5, the study team, in coordination with the sponsor, stakeholders, and commands, identified "use cases" that could be used to help assess alternative funding models. We define a "use case" as a situation in which a problem is perceived because something is not currently working well or may not work well in the future. The use cases serve three purposes. First, they are illustrations of the problems resulting from many issues identified in earlier appendices. Second, they provide a mechanism for identifying improvements in accounting practices (see Appendix L). Third, they provide concrete ways of evaluating alternative courses of action (see Appendix M) in addition to the criteria discussed in Chapter 4.

## Use Case #1: Lack of Transparency and Appropriateness of Indirect Rates

Reimbursable customers and stakeholders often express frustrations about their ability to understand indirect rate calculations and policies (i.e., transparency) and the equitability and legality of those indirect rates (i.e., the appropriateness).

Indirect rates inherently lack transparency because they fund activities that are not traced directly to a customer, like direct costs, which are easier for a customer to observe and monitor. Customers and stakeholders worry that this lack of transparency can lead to inappropriate indirect rates. A lack of transparency and close oversight increases customer concerns that suppliers are engaging in inappropriate indirectly funded activities, for which the suppliers make the customers pay.

RDECOM's transition to a tiered indirect rate structure (discussed in detail in Appendix A and Appendix D) illustrates this use case. A goal of the AMC CONOPS is to increase the appropriateness of indirect rate structures, thereby ensuring compliance with law and Army policies and improving equity. For example, when the TARDEC Systems Engineering Directorate implemented Tier 3 indirect rates, customers of branches with high indirect costs paid much higher indirect rates than other customers (see Table D.3). Ironically, RDECOM's adoption of the AMC CONOPS, which increased appropriateness, increased concerns about appropriateness because it reduced customer and stakeholder transparency—at least during the transition period.

## Use Case #2: Lack of Transparency in Customer-Provider Transactions

Whereas Use Case #1 described transparency concerns regarding reimbursable transactions from a customer and stakeholder point of view, Use Case #2 includes concerns from an auditor's

point of view. In discussions with suppliers, customers, and stakeholders from across DoD, we heard concerns about both auditability and transparency. Given recent Army efforts to improve auditability and Deloitte's findings that all funding mechanisms can be made auditable (discussed in Appendix H), we concluded that only the lack of transparency of reimbursables qualified as a use case.

### *Auditability Concerns*

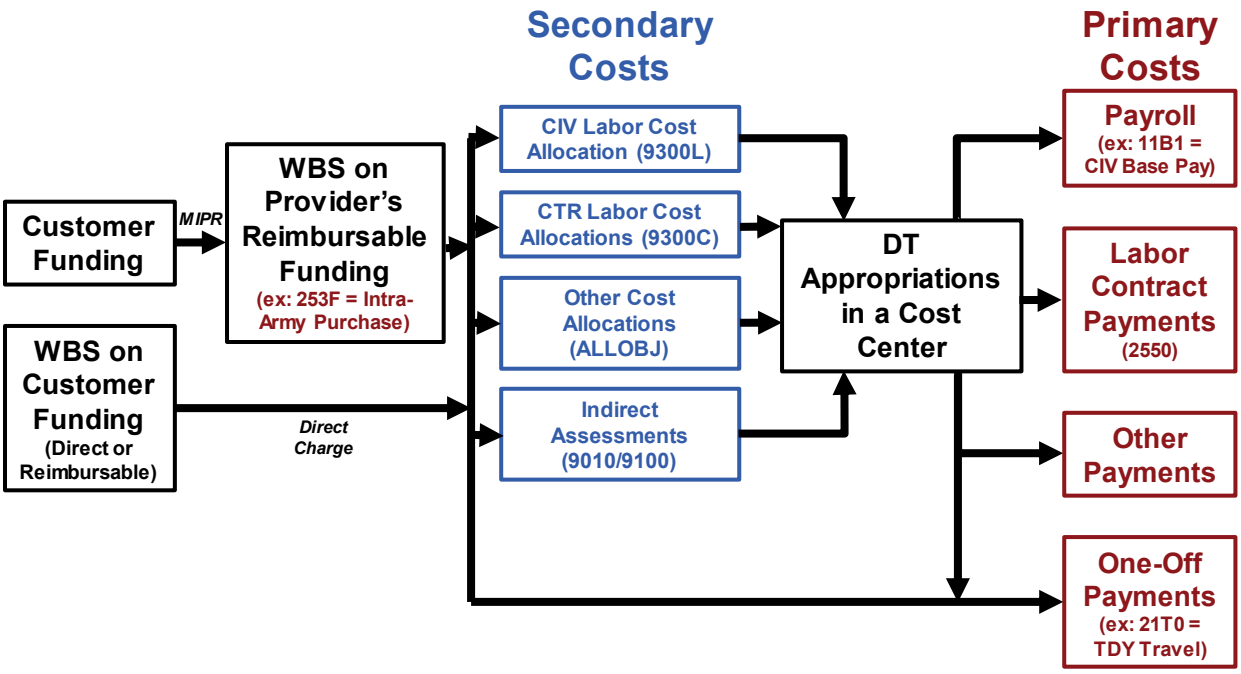
Reimbursables complicate financial auditability. Of particular concern are eliminations; that is, efforts needed to avoid double counting of funding on MIPRs when a customer and provider both record transactions. Many stakeholders were concerned about the potential to double count reimbursable transactions. As an illustration, the reimbursable process on the top of Figure K.1 requires commitments, obligations, expense, and disbursement (COED) transactions when the customer funds the WBS and another set of COED transactions when the supplier incurs the expenses. Adding COED transactions across the Army would count these COED transactions twice; hence the eliminations process needs to subtract one set of transactions. Our discussions with the Army indicate the auditability of these transactions has been improved through several improvement efforts. For example, the Army has modified GFEBS reports to mitigate double counting, strengthened policies regarding DD 1144s to better document the transactions, and implemented additional rules (e.g., no "third-party MIPRs"). Although reimbursables complicate auditability, no one we spoke with identified any reason why reimbursables were not auditable.

### *Transparency Concerns*

Traditional reimbursables are difficult to track. For example, a customer will see only a single type of charge to fund the MIPR in GFEBS (e.g., 253F, Intra-Army Purchase shown in Figure K.1), whereas execution of direct appropriations or a direct charge could show a richer breakout of costs (however, we were told by both customers and providers that with some effort anyone with access to GFEBS can find details of MIPR transactions).

As mentioned earlier, AMC has a waiver from using direct charge within GFEBS. Instead, AMC subordinates typically use reimbursables to fund work for others. Even though they are not exempt from using direct charge, ATEC uses direct charge relatively rarely since its customers typically use reimbursables to fund work.

**Figure K.1. Notional Example of Flow of Reimbursable (Top) and Direct Charge (Bottom) Funding and Cost Allocations (Secondary Costs) at an ATEC Test Center**




NOTE: Customer funding is placed on a WBS through a MIPR or direct charge (left). Cost allocations/secondary costs (blue) allocate the costs of civilian and contractor hours worked direct to tests based on ATAAPS and CIMS timekeeping entries as well as other allocations of direct costs (e.g., fuel and leased vehicles). If applicable, cost allocations for indirect assessments also occur. Primary costs (red) are paid from appropriations but reduced due to credits from customer funding through the secondary costs.

RAND Arroyo Center asked Deloitte to identify the audit requirements for the full appropriations, reimbursable, and WCF models and to compare the relative strengths and weaknesses of each model. Appendix H summarizes Deloitte's findings. Importantly, Deloitte did not actually perform an audit to determine whether either command is auditable. Instead, they identified auditability requirements. Deloitte concluded all the funding methods are potentially auditable, but reimbursables imposed some of the heaviest requirements on suppliers. Notably, the auditability requirements of direct cite and direct charge are the smallest for suppliers, but when a whole-of-Army perspective is considered, full appropriations produces the fewest requirements.[1]

[1] As Table H.2 shows, direct appropriations require 13 KSDs. However, in any customer-supplier relationship the customer must also be auditable by satisfying the audit requirements for appropriations. So, in a customer-supplier relationship that uses direct charge, the customer is still required to retain supporting materials for 13 KSDs while the supplier is required to retain materials for 11 KSDs. For reimbursable transactions, suppliers are required to retain materials for 18 KSDs. Therefore, the full appropriations model reduces overall KSD requirements because there is not a customer-supplier relationship.

## Use Case #3: Contractor Cost Allocations Artificially Reduce Reported Disbursements

GFEBS uses cost allocations to allocate pooled costs to customers who directly benefit. ATEC has large standing contracts used across test efforts and performs a similar cost allocation to fund those contracts, which are paid through ATEC's appropriations. Civilian labor cost allocations work well because civilian labor is committed, obligated, expensed, and disbursed when civilians are paid. In contrast, there is a delay between when contractors perform work and when the funding is disbursed to the contractors. This delay means the process is incompatible with OSD's disbursement analysis process because it artificially decreases disbursements of ATEC's appropriations during the fiscal year and for a few months after the fiscal year while the contractor's invoices are processed.

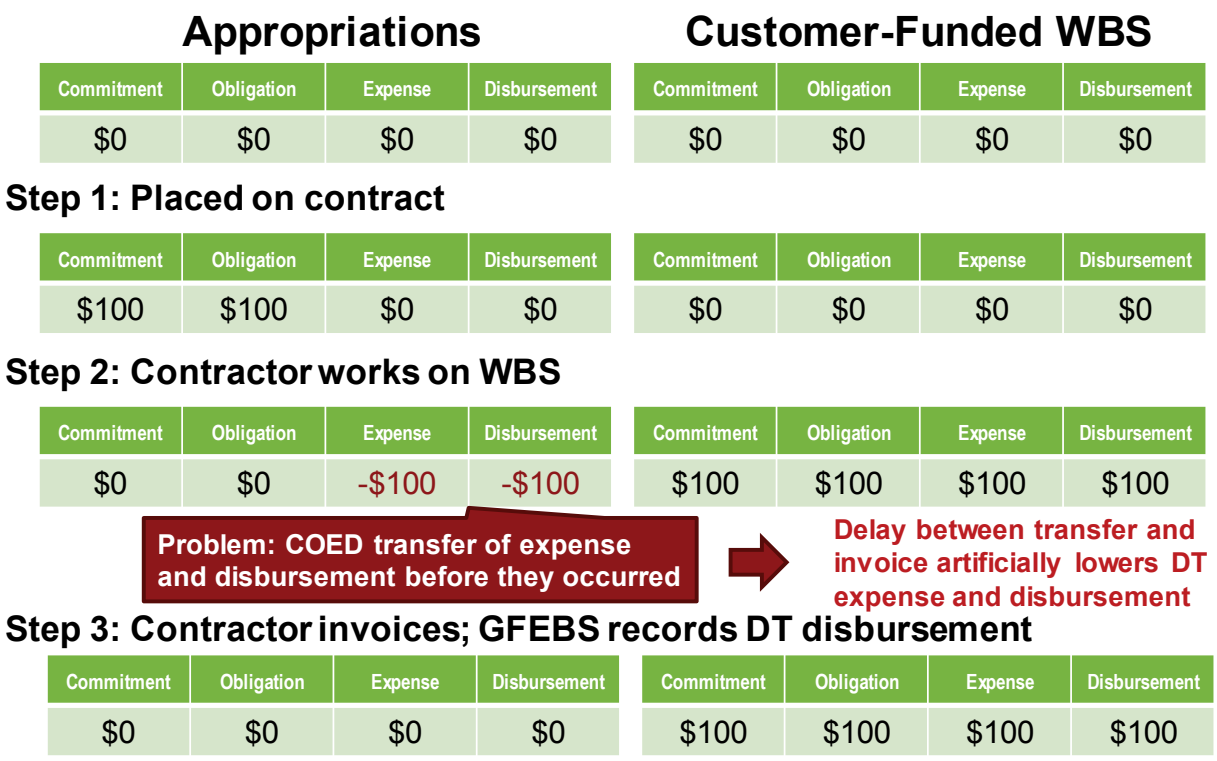
Cost allocations are a form of "direct activity allocation" used in SAP, the underlying commercial ERP on which GFEBS is based. Figure K.1 shows that these costs are paid with "primary costs," but these costs are allocated to direct activities through "secondary costs." ATEC's contractor cost allocations are unusual, but cost allocations are relatively common in GFEBS allocation of labor costs. In GFEBS, payroll for any person is paid using a single source of funding. Any Army organization that is funding labor through customer-provider relationships and/or that has personnel funding through multiple sources of funding must use this process to transfer costs to the appropriate source of funding based on hours charged and reported through ATAAPS.[2] However, unlike the contractor cost allocation process, there are no delays that cause disbursement credits to sit on direct funding for extended periods of time.

Figure K.2 shows an example of contractor cost allocation transactions at ATEC. At the beginning of the fiscal year (top line) all transactions are zero because no funding activity has occurred. In Step 1, ATEC places a contract citing its appropriations. (In this notional example, to simplify the math, ATEC places $100 on the contract, but in reality, ATEC places large amounts of funding in Step 1 because it covers contract labor used across a variety of different tests as well as indirect costs funded by appropriations.) This obligates $100, increasing both the Commitment and Obligation to $100. In Step 2, the contractor performs work on a project funded with a customer-funded WBS. The contractor personnel submit their time cards. When

[2] Our conversations with RDECOM and ATEC indicated there is no Army standard method of citing funds to pay for civilian payroll (i.e., primary labor costs). For example, ATEC uses direct appropriations to fund primary civilian labor costs. RDECOM, on the other hand, funds its personnel cost centers based on TDAs. Personnel who are identified as direct funded charge the appropriate line of funding, while payroll for personnel who are identified as reimbursable charge a reimbursable carrier line (i.e., an unfunded account that nets to zero at the end of the year). RDECOM indicated their current business practice was a result of a previous study of its business practices that recommended that these cost centers be mapped to TDAs rather than from Army policy. Prior to implementing this business practice, RDECOM mapped payroll to a small number of funds, which simplified variance analysis (this process generates variance because the cost allocations are based on DASA-CE faces-to-spaces rates that create average labor bands and inflate the cost of hours to fund paid leave).

contractor time is recorded in GFEBS, it creates a transfer (the direct activity allocation from the primary costs to the second costs) across all COED cost categories. Consequently, it appears to the customer that their money has been fully dispensed and disbursed. However, it results in a negative expense and disbursement on the appropriations since the funds have not yet been paid to the contractor. In effect, ATEC's appropriations have been credited with funding from ATEC's customers. In Step 3, the contractor invoices ATEC and DoD pays the bill using ATEC's appropriations. Payment of the bill removes the credit for expenses and disbursements.

**Figure K.2. Example of Contractor Cost Allocation Transactions at ATEC**




When all transactions are done, there is no impact to ATEC's appropriations—all costs are on the customer-funded WBS. The issue is there is a lag between the time the contractor performs the work and when the contractor's invoice is paid. If OSD looks at disbursement of funds in the middle of a fiscal year or soon after the end of the fiscal year when funds have not been disbursed, the level of disbursement on ATEC's appropriations are artificially low.

Table K.1 shows actual data of RTC's execution in FY 2017 in the middle of the year. Fund 204020D16 is RTC's 2016 RDT&E appropriations (and 204020D17 is appropriations for 2017). In the middle of the year, RTC shows net negative disbursements on their 2017 appropriations due to contractor cost allocations. However, at this point in 2017 they disbursed nearly $30 million of FY 2016 funds (despite having only about $10 million of appropriations), largely to

contracts. The 2016 funding has caught up as contractors invoiced for their work in 2017. At the bottom of the table is fund 204020A16, which is RTC's reimbursable funding (and 204020A17 is reimbursable funding for 2017). Reimbursable customers are allocated large amounts of contractor labor costs for both years, which have been transferred to the appropriations at the top of the table using a COED transfer (e.g., about $33 million of funding across 2016 and 2017 was transferred through 9300C—contractor labor).[3]

**Table K.1. Example of Midyear Transactions at RTC, FY 2017 Through May 15, 2017 ($Millions)**

| Fund | Commitment Item | Fund Year | Commitments | Obligations | Expenses | Disbursements |
|---|---|---|---|---|---|---|
| 204020D16 | 2550 (Contracts) | 16 | $1.6 | $1.6 | $28.0 | $29.8 |
| 204020D16 | ALLOBJ (Other alloc.) | 16 | −$2.9 | −$2.9 | −$2.9 | −$2.9 |
| 204020D16 | 9100/9010 (OH) | 16 | −$0.4 | −$0.4 | −$0.4 | −$0.4 |
| 204020D16 | 9300C (CTR Labor) | 16 | −$11.0 | −$11.0 | −$11.0 | −$11.0 |
| 204020D16 | All other | 16 | $2.6 | $2.6 | $11.1 | $13.1 |
| **204020D16** | **Total** | **16** | **−$10.1** | **−$10.1** | **$24.8** | **$28.5** |
| 204020D17 | 2550 (Contracts) | 17 | $46.2 | $42.9 | $22.9 | $21.6 |
| 204020D17 | ALLOBJ (Other alloc.) | 17 | −$3.1 | −$3.1 | −$3.1 | −$3.1 |
| 204020D17 | 9100/9010 (OH) | 17 | −$36.6 | −$36.6 | −$36.6 | −$36.6 |
| 204020D17 | 9300C (CTR Labor) | 17 | −$22.7 | −$22.7 | −$22.7 | −$22.7 |
| 204020D17 | All other | 17 | $26.4 | $26.0 | $17.3 | $15.7 |
| **204020D17** | **Total** | **17** | **$10.9** | **$7.2** | **−$21.9** | **−$24.7** |
| 204020A16 | 2550 (Contracts) | 16 | $5.0 | $4.3 | $8.9 | $9.1 |
| 204020A16 | ALLOBJ (Other alloc.) | 16 | $3.8 | $3.8 | $3.8 | $3.8 |
| 204020A16 | 9100/9010 (OH) | 16 | $20.0 | $20.0 | $20.0 | $20.0 |
| 204020A16 | 9300C (CTR Labor) | 16 | $18.2 | $18.2 | $18.2 | $18.2 |
| 204020A16 | All other | 16 | $8.7 | $8.9 | $12.4 | $12.4 |
| **204020A16** | **Total** | **16** | **$55.7** | **$55.2** | **$63.3** | **$63.5** |
| 204020A17 | 2550 (Contracts) | 17 | $3.7 | $1.9 | $0.1 | $0.1 |
| 204020A17 | ALLOBJ (Other alloc.) | 17 | $2.1 | $2.1 | $2.1 | $2.1 |
| 204020A17 | 9100/9010 (OH) | 17 | $16.5 | $16.5 | $16.5 | $16.5 |
| 204020A17 | 9300C (CTR Labor) | 17 | $15.1 | $15.1 | $15.1 | $15.1 |
| 204020A17 | All other | 17 | $11.9 | $11.8 | $9.2 | $9.2 |
| **204020A17** | **Total** | **17** | **$49.2** | **$47.4** | **$42.9** | **$42.9** |

SOURCE: RAND Arroyo Center analysis of FY 2017 GFEBS data from ATEC, as of May 15, 2017.
NOTES: CTR = contractor; OH = overhead.

[3] Numbers do not add up exactly because RTC continued to execute reimbursable funding older than 2016 if it was through project orders, which is not shown in the table.

## Use Case #4: Potential for Inappropriate Cost Transferring

We define "cost transferring" as the substitution of reimbursable funding from customers for reduced appropriations. One skeptic of reimbursable funding described this as a "shell game" where the Army thinks it is finding efficiencies by cutting appropriations but reimbursable organizations instead shift the costs to their customers and is contrary to the intent of the cuts.

Our exploration of increases in RDECOM indirect cost increases revealed several cases of cost transferring. We did not explore these cases in enough depth to understand fully whether the cost transferring was inappropriate. All three potential instances of cost transferring identified were reasons RDECOM personnel cited for the hypothesis that indirect costs at RDECOM have not increased but only shifted (see Appendix D). First, other Army providers such as IMCOM are now billing for services it previously provided to customers for "free," such as mowing the lawn and removing trash. Second, RDECOM increased indirect budgets to make up for losses in BA 6.6 funding. RDECOM management was unable to establish why the appropriations were cut but acknowledged they increased indirect rates to make up for the reduced funding. Third, RDECOM engaged in cost transferring when it implemented the AMC CONOPS. As the TARDEC example in Appendix D shows, indirect costs that were previously paid by S&T appropriations were appropriately shifted to indirect cost pools. This cost transferring was clearly appropriate because it was consistent with the CONOPS when the costs benefit both the S&T mission work and reimbursable customers and cannot be allocated directly.[4]

Any activity funded from multiple sources has potential cost transferring issues. For example, even when an organization is funded entirely from appropriations, if the organization received two lines of funding it can transfer costs between the two lines of funding by, for example, allocating more indirect costs on a line of funding with more resources. As noted above, cost transferring is especially risky when combining two types of funding for one type of cost (e.g., appropriations and customer reimbursables funding indirect budgets). The move toward *Cost Accounting Standards* for government contractors was motivated by the concern contractors would fund their indirect costs from the market (through commercial products) as well as the government (perhaps multiple times through multiple contracts), which would lead to an over-recovery of indirect costs and, hence, a large profit for the contractor. Oversight, therefore, provides a primary mode of defense against cost transferring, regardless of funding model.

[4] It is unclear if lost appropriations motivated this transition. For example, the analytics branch clearly experienced a reduction in appropriations because a large amount of labor costs that were previously funded by appropriations shifted to its indirect cost pool (see Table D.5). However, TARDEC as a whole increased its appropriated funding between FY 2016 and FY 2017.

## Use Case #5: Potential Subsidies for Non-Army Customers

Appropriations for indirect costs can potentially subsidize non-Army customers. MRTFB policies were designed to reduce the costs that DoD customers pay for testing by having customers pay for direct costs of tests while the military departments pay for indirect costs. Many personnel from ATEC did not believe subsidies are a problem; instead, they believe that subsidies are a feature of the MRTFB funding rules. After all, all military departments will subsidize customers from all the other military departments. On the other hand, based on the study team's analysis, it seems likely subsidies can create dysfunctional incentives.

Subsidies may exist when the Army must invest in a capability needed by other military departments or when the use of a capability by the other military departments increases general sustainment costs that cannot be charged to a single customer. In contrast, offering excess capacity of a capability to other military departments and charging the direct costs of testing is not a subsidy; the indirect costs are fixed costs the Army would pay anyway. Further, offering excess capacity to other military departments can potentially reduce indirect costs of personnel working the tests who would otherwise be idle or underutilized.

The White Sands' FBR illustrates the challenges of subsidies. There is some question of whether the FBR is currently a subsidy to other military departments. Although non-Army customers are about 80 percent of the FBR's hours, the Army still uses the FBR for nuclear survivability testing. Many similar capabilities have been shuttered in recent years. According to FBR personnel, disinvestment has left the FBR as a unique capability for which no suitable alternatives exist to meet U.S. government-wide requirements that are growing due to changes in the threat landscape. Therefore, it is possible that the Army would have shut down the FBR were it not for MRTFB rules. However, our conversations with FBR personnel indicated most of the FBR's high indirect costs are from security guards (most of the $7 million in indirect costs versus $450,000 in direct costs), who likely would still be needed to protect a mothballed FBR.

Regardless of whether the Army is truly subsidizing non-Army customers, discussions of future investments hinge on issues of subsidies. According to FBR personnel, the Army is investigating a new reactor design to lower security costs but would only be capable of producing effects needed for Army survivability testing. The unique capabilities currently provided by the FBR for non-Army customers would no longer be provided. If the new reactor design proves to be feasible, and if the Army chose instead to upgrade the FBR, any additional costs that the Army spent on this upgrade above an alternative design could be classified as subsidies. Since the Army provides appropriations for indirect costs, the funding model incentivizes investments benefiting the Army rather than investments benefiting the full customer base.

Another investment the Army is considering is building a vault to reduce the cost of security operations. High levels of security would only be necessary when the FBR was removed from

the vault, saving on security costs in off-hours. Under this concept, it may be possible for the increased costs due to testing to be shifted to customers as a direct cost, depending on interpretations of MRTFB policy. The danger of this funding model is that the overall costs of the investment to the U.S. government could be higher, but it might be more attractive to the Army because it would lower the Army's costs.

# Appendix L. Additional Details About Some Potential Improvements

This appendix provides additional details about some of the improved accounting practices the team identified and considered in the evaluation of alternative courses of action (Appendix M). This appendix also discusses additional improvements we considered but did not recommend. Table L.1 shows the improvements explained in more detail in this appendix.

**Table L.1. Potential Improvements Discussed in Appendix L**

| Improvement | Recommended? |
|---|---|
| 2. Disclosure of cost accounting practices | Yes: Improvement #2 (Chapter 6) |
| 3. Consistency of funding indirect costs | Yes: Improvement #3 (Chapter 6) |
| 5. Standardize DD 1144 reporting | Yes: Improvement #5 (Chapter 6) |
| 10. Increased direct charge | No: Seek improvements in direct charge (see Chapter 7) |
| 11. Self-MIPRs for contractor cost allocations | No: Seek other ways to improve cost allocation reporting (see Chapter 7) |

## Improvement #2. Require a detailed disclosure of cost accounting practices from all provider organizations

RDECOM and ATEC provide high-level guidance on cost accounting policies and rules, but detailed disclosures of actual policies at these organizations are not required and generally not provided. Recently, the DASA-CE began asking ATEC for a narrative to justify the indirect rates set in GFEBS, which provides some degree of disclosure of actual practices.

Table L.2 lists sources of policy guidance for cost accounting and required disclosures of cost accounting practices at RDECOM, ATEC, and large government contractors. Government contractors are subject to high-level policy rules, just like RDECOM and ATEC, but they also must submit detailed disclosures of their actual practices, which allows observers such as government auditors to understand how they have chosen to implement the policies. Policy guidance can rarely be prescriptive and must often provide organizations ground rules under which the organizations can choose how to implement their practices within the guidance. The need for flexible guidance is especially true with cost accounting, where there are often gray areas in issues like the definition of a direct versus an indirect cost. Further, suppliers have flexibility to tailor their systems to meet their business needs—as an example, ATEC's MRTFBs use a single indirect rate for non-DoD customers while RDECOM has a much more detailed structure of multiple-tiered indirect cost pools (whose implementation varies considerably across organizations—see Figure A.4).

**Table L.2. Sources of Cost Accounting Policy Guidance and Required Disclosures of Practices for RDECOM, ATEC, and Large Government Contractors**

| Organization | Policy Guidance | Disclosure of Practices |
|---|---|---|
| RDECOM | • FMR<br>• ATEC 37–11 | • N/A |
| ATEC | • FMR<br>• AMC Reimbursable CONOPS | • N/A |
| Large government contractors | • Federal Acquisition Regulation (FAR)<br>• Cost Accounting Standards (CAS) | • Cost Accounting Standards Disclosure Statement |

Contractors must disclose their cost accounting practices through a standardized template called the Cost Accounting Standards Board (CASB) Disclosure Statement.[1] The CASB Disclosure Statement template is 41 pages long (completed disclosure statements would be considerably longer). Table L.3 lists the topics covered in the template and examples of the information that the contractor must provide.

**Table L.3. Topics and Examples of Required Information on CASB Disclosure Statement**

| Section | Topic | Examples |
|---|---|---|
| Part I | General information about the contractor | Percentage of sales to the government |
| Part II | Direct costs | How are labor rates determined? What happens to variances? |
| Part III | Direct versus indirect costs | Is training direct or indirect or both? What cost pools is training charged to? |
| Part IV | Indirect costs | What are the indirect cost pools? What is the purpose of each indirect cost pool? How are costs in each indirect cost pool allocated to direct costs? |
| Part V | Depreciation and capitalization practices | Which depreciation accounting methods are used and when? How is useful life of assets determined? |
| Part VI | Other costs and credits | Details about leave and severance pay |
| Part VII | Deferred compensation and insurance cost | Details about retirement plans |
| Part VIII | Home office expenses | Details about how costs are recovered for a corporate HQ that oversees multiple businesses |

[1] Contractors fill out CASB DS-1. A different template exists for universities: CASB DS-2.

Disclosures enable a high level of transparency about practices. Policy guidance provides rules, but it is insufficient for developing a detailed understanding of actual practices. For example, the study team had to conduct numerous discussions and data calls to understand practices, and this understanding is often complicated by differences in vocabulary and policies within and among organizations. Disclosures also provide a high level of transparency regarding changes in cost accounting practices. As RDECOM and its customers discovered with the implementation of the AMC CONOPS, changes to practices can be painful—especially when they surprise customers. Practices can be changed, but they require a change in the disclosure that would garner a high degree of scrutiny from the customer to determine how the changes will impact the customer's bottom-line costs, for example.

## Improvement #3: The disclosure of cost accounting practices should require consistency in how costs are funded

As the research reviewed in Appendix E suggests, internal DoD pricing creates the best incentives when it charges customers only for the marginal costs that their demands place on an internal supplier. Therefore, over the long term, (near) full cost recovery could allow both RDECOM and RTC[2] to use appropriations to fund fixed costs while charging customers directly for variable costs. The study team did not conduct a thorough analysis of what costs are fixed versus variable at these commands. In our judgment, RTC seems to come close to charging customers only for variable costs. Appropriations at RTC cover many RTC headquarters costs, which are likely to be largely fixed costs, while customers are charged for direct costs and indirect directorate costs, which include variable costs like supervisory time[3] and capability sustainment costs.[4] RDECOM's BA 6.6 appropriations for indirect costs, on the other hand, are likely smaller than RDECOM's fixed indirect costs. For example, Table D.2 shows that AMRDEC's BA 6.6 funding was zero in FY 2017. However, RDECOM is a relatively human-capital-centric organization compared with ATEC, and RDECOM can easily divest of capabilities in low use and retask its personnel to other activities; thus, its fixed costs are likely to be relatively low.

[2] Ideally, ATEC's MRTFBs would as well, but such a realignment of costs would likely require amending MRTFB policy.

[3] Supervisory time is largely a variable cost because it is driven by the DLH of the personnel who report to that supervisor. If those personnel went to other directorates due to a lack of work from customers, supervisors could be reassigned to other directorates or be reassigned to nonsupervisory roles.

[4] RTC's sustainment costs are largely variable since RTC often divests of capabilities without strong customer demand. Sustainment costs at MRTFBs, however, are largely fixed costs because MRTFB capabilities cannot be divested easily.

## Improvement #5: RDECOM/AMC and RTC should standardize the reporting of indirect rates and costs to customers

By reviewing DD Form 1144 agreements and having discussions with suppliers, customers, and stakeholders, the study team found that the information in the 1144 is misleading and recommends the suppliers work to develop a better template. The suppliers we spoke with usually believed that the 1144s are a bureaucratic requirement required by auditors that adds workload and does not add real value. The customers, on the other hand, usually told us that they use the 1144s to understand supplier policies. Further, it was sometimes clear the customers were misinterpreting the information. Table L.4 lists the information included in the 1144s, an example, and a short critique of the transparency challenge, which we expand on below.

**Table L.4. Information Included on DD 1144s and Example ($Millions)**

| Data Category | | Example |
|---|---|---|
| Direct costs | Labor | $46 |
| | Nonlabor | $8 |
| Indirect costs | | $19 |
| Sec. 219 | | $1.5 |
| FTEs | Labor | 333.9 |
| | Indirect | 59.9 |

One common criticism customers had of indirect rates was that they believed they were being charged a unique rate on every project. It is likely they generated this impression by calculating an average rate from the 1144. Even if all projects are subject to a common set of indirect rates, the average indirect rate on a project will change depending on the labor composition of the project (e.g., a project with relatively more personnel from a directorate with a high indirect rate increases the average indirect rate on the project).

Another misinterpretation we heard was the customers were assuming all the indirect costs were for labor—in this example, that would mean that the average costs of indirect labor was $319,000 per FTE. Presenting some breakdown of the composition of indirect costs may help to alleviate this misinterpretation.

Another area where customers were often confused related to the direct costs of labor, which seemed expensive. There appeared to be two drivers of this confusion. First, the direct costs also include the costs of labor benefits. Second, labs and test centers are often on a different compensation system than the rest of the government, which can drive up labor costs. Additional details that breakout direct labor costs may help alleviate this confusion.

One possible way 1144s could potentially be improved is through nested layers of details. It is common for more detailed data to be included as attachments to the 1144s (e.g., ATEC usually provides a much more detailed test estimate of the resources needed). However, these attachments require the user to open an attachment and may be too detailed for many audiences interested in high-level details. A dynamic nested presentation of data, enabled through electronic forms, could make the details more accessible to varied audiences.

## Improvement #10: Require direct charges instead of reimbursables in GFEBS (Not recommended)

As discussed in Chapter 7, direct charge has several advantages over reimbursables in GFEBS. Most importantly, direct charge would increase compliance with OUSD(C) guidance to reduce reimbursables.

However, direct charge has limitations, which are discussed in Chapter 7. Most notably, direct charge creates problems in reporting which organization's personnel are used to execute funding. Consequently, greater use of direct charge would improve the Army's accounting, but it would introduce new problems. Therefore, the study team did not recommend increasing direct charge immediately but instead recommended identifying ways to improve direct charge so that it can be the GFEBS standard in the future.

## Improvement #11: Use Self-MIPRs for ATEC's Contractor Cost Allocations to Prevent Underreporting of Disbursement (Not recommended)

In the past, ATEC has sought but failed to obtain approval to utilize self-MIPRs to alleviate this reporting problem. If ATEC could cite automatic funding for contracts, disbursement credits would no longer be placed on their direct funding; hence disbursement rates for appropriations would be accurate throughout the year. A straightforward way of citing automatic funding is by using self-MIPRs (i.e., self-reimbursement that creates an automatically funded WBS that can be cited). Self-MIPRs have been an Army-standard way of doing business in many areas that are well understood by financial personnel. For example, ATEC must use self-MIPRs at West Desert Test Center (WDTC) (at Dugway Proving Ground) to charge civilian labor costs to DoD chemical/biological defense funding. Self-MIPRs have also been commonly used to charge civilian labor to Army procurement funding, although funds are being shifted to O&M to preclude this practice.[5]

[5] The FMR allows procurement funds to pay for "in-house personnel funded on a reimbursable basis" for a limited set of functions, such as testing and production engineering, but procurement funds cannot otherwise be used to pay for in-house personnel (FMR, vol. 2A [010201D3j]).

However, the Army is considering the elimination of self-MIPRs. The Army has found that

> the self-Military Interdepartmental Purchase Request (MIPR) is not a valid business process, is not authorized by regulation, and can lead to violations of fiscal law. The process is considered high risk from an audit perspective and is prohibited. Audit findings concluded that self-MIPRs do not represent a true buyer/seller relationship and falsely overstate the financial statements.[6]

The Army currently allows only three uses of self-MIPRs: (1) when organizations are prohibited from directly charging civilian pay, self-MIPRs can move funding into a reimbursable fund that the organizations can charge; (2) when organizations are moving funds between accounting systems; and (3) "for organizations that cannot disclose their original funding source for security reasons."[7] ATEC is unlikely to receive approval for using self-MIPRs in the future now that the practice is being phased out. Therefore, the study team did not recommend this change in accounting practices.

As an alternative to using self-MIPR, in Chapter 7 the study team recommended that the Army seek ways to improve ATEC's disbursement reporting for contractor cost allocations.

[6] Wesley C. Miller, Deputy Assistant Secretary of the Army (Financial Operations), "Fiscal Year 2018 Revenue—Approved Exceptions to the Business Processes Associated with Military Interdepartmental Purchase Requests," SAFM-FO memo, Washington, D.C., June 12, 2018.

[7] Miller, 2018.

# Appendix M. Evaluation of Alternative Courses of Action

This appendix describes the result of detailed evaluations of alternative courses of action across RDECOM and ATEC's test ranges. Figure M.1 provides an overview of the strategy used to assess the alternative courses of action. The left column shows the evaluation criteria (introduced in Chapter 4 of the main report) and the use cases (discussed in Appendix K). On the top, middle are the alternative funding models discussed in Chapter 3 and Appendix F. On the bottom, middle are possible improved accounting practices, which include the recommended improvements discussed in Chapter 6 and Appendix L. The study team considered two other improvements, discussed in Chapter 7 and Appendix L, that were also included in this evaluation. Finally, the right column shows that organizations and activities that were evaluated. All evaluations use a common set of symbols, described in Table M.1, to evaluate the pros and cons of different aspects of the alternative courses of action.

The study team used this analysis to help develop recommendations on funding models presented in Chapter 5 and to identify recommended improvements in Chapter 6. Two of the improvements the study team considered in the evaluation were not included in the recommended improvements. Improvement #10, Increased Direct Charge, is an attractive improvement since it would help minimize reimbursables and promote auditability and transparency while retaining current customer-supplier relationships. However, there are several limitations that the Army must fix before requiring widespread use of direct charge. Chapter 7 discusses this challenge in detail. Early in the study, Improvement #11, "Self-MIPRs for Contractor Cost Allocations," appeared an attractive short-term alternative to contractor cost allocations while a longer-term fix was developed (see Chapter 7 for a discussion of some potential long-term alternatives that the Army is exploring or could explore). However, the Army is considering the elimination of self-MIPRs, and, consequently, it no longer appears to be a feasible option.

**Figure M.1. Overview of Assessment Strategy**

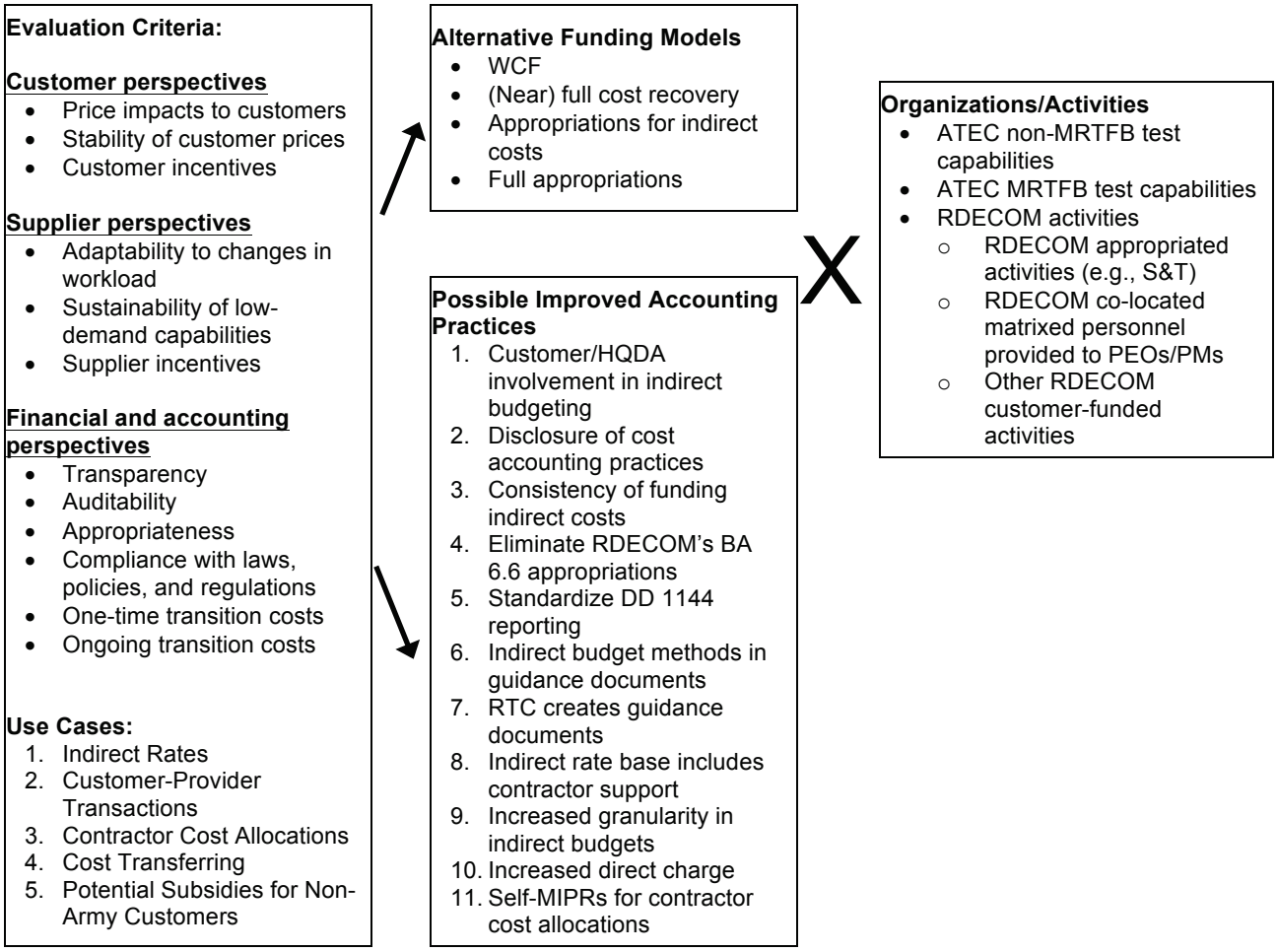



**Table M.1. Key for Evaluations of Alternative Funding Models in Appendix M**

| Key |
|---|
| + Improvement over the status quo |
| ○ Neutral relative to the status quo |
| – Worse than the status quo |

Table M.2 provides the detailed assessment of the alternative funding models for RDECOM. Table M.3 does the same for ATEC's MRTFB capabilities and Table M.4 for ATEC's non-MRTFB capabilities and RTC. Table M.5 assesses the possible improvements to accounting practices.

**Table M.2. Evaluation of Alternative Funding Models for RDECOM**

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Implementation | ○ Approval to get a WCF charter<br>– IT systems and resource management (RM) personnel to track costs and create required financial accounts and budget exhibits<br>○ Supplier's appropriations (operations and capital) would be shifted to customers<br>○ Customers may need to be identified or created for appropriations that fund mission<br>– Difficult to forecast which customers should receive this funding<br>– Cash to shift over to WCF | ○ No impact (status quo) | ○Indirect recoveries from current customers would be shifted to supplier appropriations<br>○ Appropriations would be POM'd two years in advance<br>– Difficult to forecast who all the customers will be two years from now to be able to shift funding | ○ Customer money would be shifted to supplier<br>○ Appropriations would be POM'd two years in advance<br>– Difficult to forecast who all the customers will be two years from now to be able to shift funding |
| Financial auditability | ○ Similar audit requirements as reimbursables (17 KSDs for WCF vs. 18 for reimbursables)<br>– Increased audit requirements compared with appropriations (17 KSDs for WCF vs. 13 for appropriations) | ○ No impact (status quo) | ○ Similar audit requirements since reimbursables and appropriations are still used (but slightly more appropriations transactions to fund indirect costs)<br>+ Fewer dollars are being transferred from customers to suppliers (no indirect recovery allocations) | + Decreased audit requirements compared with reimbursables (18 KSDs for reimbursables vs. 13 for appropriations)<br>+ Dollars do not need to be tracked from customers to suppliers (i.e., eliminates customer KSDs) |
| Transparency: To customer into indirect costs, rates, and processes | ○ Like (near) full cost recovery<br>– Customers usually operate in GFEBS and have less visibility into LMP | ○ Customers have little visibility into indirect costs or reasons for changes in indirect rates | + Customers no longer pay indirect rates, so they do not require transparency | + Customers no longer pay indirect rates, so they do not require transparency |
| Transparency: To HQDA into indirect costs, rates, and processes | + There would be an oversight mechanism that would improve transparency (ARRG) | ○ HQDA has little visibility into indirect costs or reasons for changes | + HQDA centrally manages indirect funding, so indirect budgeting will have to be responsive to them | + HQDA centrally manages indirect funding, so indirect budgeting will have to be responsive to them |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Transparency: Into factors that drive mission costs | + More information about how capital costs contribute to mission | ○ Supplier tracks indirect costs and allocates them to mission projects | – Becomes more difficult to track how indirect costs benefit mission projects | – Becomes more difficult to track individual efforts paid for out of the same appropriation |
| Appropriateness | ○ Similar to status quo since indirect rate structure is similar to status quo<br>– Future customers absorb positive or negative net operating cost | ○ Rate model is standardized through AMC CONOPS, but differences between labs exist and customers question appropriateness of models | + Rates not being charged to customers, so all customers are treated equally in terms of indirect rates | + Rates not being charged to customers, so all customers are treated equally in terms of indirect rates |
| Compliance with laws, policies, and regulations | + Exempted from OUSD(C) guidance to minimize reimbursables | ○ Labor and indirect costs are reimbursable<br>○ Would need to increase direct charges to reduce reimbursable charges | + Reduces reimbursable charges | + Most compliant with OUSD(C) guidance to minimize reimbursables |
| One-time transition costs | – Major transition costs to convert to WCF | ○ No impact (status quo) | – Would take some effort (but less than full appropriations) to estimate how much money gets transferred and from which customers | – Would take some effort to estimate how much money gets transferred and from which customers |
| Ongoing transition costs | – Additional work for financial reporting | ○ No impact (status quo) | + Nothing significant | + No significant ongoing transition costs or benefits |
| Price impacts on customers | ○ Customers likely pay more, but how much more is uncertain (depends on IMCOM, LMP, etc. costs) | ○ No impact (status quo) | ○ Customers pay less | ○ Customers pay nothing |
| Stability of customer costs | + Prices would be more predictable within a year<br>○ Stability from year to year depends on workload and indirect costs remaining relatively constant or changing proportionately<br>– Prices could change more across years due to profits/losses | ○ Depends on workload and indirect costs remaining relatively constant or changing proportionately (e.g., prices could increase if labor costs go up, workload falls while indirect costs remain constant, or more costs are recovered through indirect recoveries) | + No fluctuations due to changes in indirect cost practices<br>– Could change if labor costs or other direct mission costs go up | + Stable; no costs to customer |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Customer incentives | – Customers may demand less, leading to underutilized capacity and potentially a "death spiral" due to fixed indirect costs being recovered on less workload | ○ No impact (status quo) | + Customers may increase demand for underutilized capabilities<br>– Customers may increase demand for capabilities at capacity | – Customers incentivized to overdemand when service is free |
| Adaptability to changes in workload | ○ Similar level of adaptability as the status quo<br>+ Some additional ability to fund capital investments through WCF depreciation charges | ○ Can expand or contract contractor workforce in response to changes in demand<br>○ Customers/mission appropriations can fund capital investments that benefit them directly<br>○ Must budget other capital investments using indirect funds | ○ Can expand or contract contractor direct workforce in response to changes in demand<br>– May stress indirect funds or have excess indirect funds as a result of flexing (e.g., there could be large indirect demand in a year when you hired more personnel)<br>– Harder to obtain funds to retrain personnel with skills needed to pivot to future Army priorities | – Need to plan changes to TDA two years in advance<br>– Little adaptability to changes in overall workload in year of execution<br>– Could be difficult to shift workload across different types of capabilities funded by different appropriations<br>+ Easier to pivot personnel between indirect (e.g., training) and direct since same source funds both<br>+ More responsive to last-minute orders (i.e., less paperwork/ KSDs) |
| Sustainability of low-demand capabilities | ○ Similar to status quo | ○ Pressure to divest of underutilized capacities because indirect costs must be recovered over smaller workload; higher prices may drive away more customers | + Can shift personnel onto indirect funding (if changes in appropriations can be planned in advance)<br>+ Easier to protect capabilities that are not needed in the short term but may be needed in the future<br>– Can be used to sustain capabilities that should be divested to better serve mission | + As long as you POM for it, everything can be sustained<br>– Susceptible to budget cuts, could lose capabilities<br>– Can be used to sustain capabilities that should be divested to better serve mission |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Supplier incentives | ○ Similar to status quo<br>+ WCF Capital Investment Program increases ability to fund capital investments from corpus and recover over time using depreciation | ○ Need to be responsive to customers to get funding<br>○ Pressure to divest of underutilized capabilities<br>○ Can shift costs into indirect rates if appropriations are cut | – Suppliers might not be as responsive if not earning indirect recoveries from customers<br>– More difficult to ask customers to fund capital investments in capacity and capability<br>– Susceptible to budget cuts<br>+ HQDA has a greater ability to force indirect cost reductions | – No incentive to be responsive to customer<br>– Need prioritization scheme if demand exceeds capacity<br>– Cannot fund overtime<br>– Reduced ability to hire and reassign personnel<br>– More difficult to ask customers to fund capital investments in capacity and capability |
| Use Case #1: Lack of transparency and appropriateness of indirect rates | ○ Rates practices are similar to status quo<br>+ Stabilized labor rates can control efficiency<br>– More disagreements and winners/losers if indirect costs grow<br>– Customers lack transparency about indirect costs | ○ Depends on supplier's indirect rates practices and how well they are communicated to customers<br>○ Could be improved through recommended improvements (Table 6.1) | + Simplifies indirect budgeting oversight<br>– Less knowledge of how indirectly funded activities affect mission<br>– Could be a target for budget cuts | + Simplifies indirect budgeting oversight<br>– Less knowledge of how indirectly funded activities affect mission<br>– Could be a target for budget cuts |
| Use Case #2: Lack of transparency in customer-provider transactions | + Exempt from DoD guidance on minimizing reimbursables | ○ Labor and indirect costs are reimbursable<br>○ Would need to increase direct charges to reduce reimbursable charges | + Eliminates reimbursable indirect recoveries<br>– Does not eliminate reimbursable civilian labor costs | + Eliminates customer to provider transfers<br>– Multiple lines of funding still require timekeeping and cost transfers |
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | N/A at RDECOM | N/A at RDECOM | N/A at RDECOM | N/A at RDECOM |
| Use Case #4: Potential for inappropriate cost transferring | + Full WCF has no appropriations to cost transfer to customers<br>– Indirect cost transfers between customers remain inherent risk in full cost recovery<br>– High risk of third-party (e.g., IMCOM) cost transfers that would erode price stability | ○ Lack of transparency in indirect funds allows costs to be shifted to indirect rates if appropriations are cut | + Cannot increase indirect rates when appropriations decrease<br>– Double billing more likely to occur for same service | + Minimizes ability to cost transfer (impossible with a single source of funding) |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Use Case #5: Potential subsidies for non-Army customers | + Full cost recovery prevents non-Army subsidies<br>– Incentivizes growing business to reduce indirect rates rather than prioritizing Army<br>– Higher prices may result in reduced workload | ○ Most costs are recovered from customers, so subsidies are minimal | + Ability to charge non-Army (e.g., FMS) customers fully loaded costs<br>+ Offers excess capacity at marginal cost<br>– Can underprice competition out of business leaving Army with sole responsibility (and bills) | + Ability to charge non-Army (e.g., FMS) customers fully loaded costs<br>+ Offers excess capacity at zero cost<br>– Could increase pressure to expand capacity if there is surplus demand at zero cost<br>– Can underprice competition out of business, leaving Army with sole responsibility (and bills) |

**Table M.3. Evaluation of Alternative Funding Models for ATEC MRTFB Capabilities**

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Implementation | – Rescind Sec. 232 of the FY 2003 NDAA to allow customers to be charged indirect costs<br>○ Approval to get a WCF charter<br>– IT systems and RM personnel to track costs and create required financial accounts and budget exhibits<br>○ Supplier's appropriations (operations and capital) would be shifted to customers<br>– Difficult to forecast which customers should receive this funding<br>– Cash to shift over to WCF | ○ Appropriations for indirect costs would be shifted to customers<br>– Difficult to forecast which customers should receive this funding | ○ No impact (status quo) | ○ Customer money would be shifted to supplier<br>○ Appropriations would be POM'd two years in advance<br>– Difficult to forecast who all the customers will be two years from now to be able to shift funding |
| Financial auditability | ○ Similar audit requirements as reimbursables (17 KSDs for WCF vs. 18 for reimbursables)<br>– Increased audit requirements compared with appropriations (17 KSDs for WCF vs. 13 for appropriations) | + Would slightly reduce audit requirements due to appropriations that are currently received for indirect costs<br>– More dollars are being transferred from customers to suppliers (indirect recovery allocations) | ○ No impact (status quo) | + Decreased audit requirements compared with reimbursables (18 KSDs for reimbursables vs. 13 for appropriations)<br>+ Dollars do not need to be tracked from customers to suppliers (i.e., eliminates customer KSDs) |
| Transparency: To customer into indirect costs, rates, and processes | – Like (near) full cost recovery<br>– Customers usually operate in GFEBS and have less visibility into LMP | – Customers would pay indirect costs for which they have little visibility or understanding of reasons for changes | ○ Customers pay only direct costs for which they have a relatively high level of transparency | + Customers no longer pay indirect rates or direct costs, so they do not require transparency |
| Transparency: To HQDA into indirect costs, rates, and processes | – Similar lack of visibility to (near) full cost recovery<br>+ There would be an oversight mechanism that would improve transparency (ARRG) | – HQDA would have little visibility into indirect costs or reasons for changes | ○ Status quo: HQDA centrally manages indirect funding, so indirect budgeting will have to be responsive to them | ○ Indirect processes same as status quo |

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Transparency: Into factors that drive mission costs | + More information about how capital costs contribute to mission | + ATEC would likely improve visibility by increasing the number of indirect cost pools and allocating indirect costs to appropriate projects | ○ Without additional efforts (like at YTC), ATEC has difficulty tracking how indirect costs benefit mission projects | – Becomes more difficult to track individual efforts paid for out of the same appropriation |
| Appropriateness | ○ Similar to (near) full cost recovery<br>– Future customers absorb positive or negative net operating cost | ○ Depends on supplier's indirect rates practices<br>– Would likely result in cases where rates are judged as inappropriate | ○ Status quo: Rates not being charged to DoD customers, so all customers are treated equally in terms of indirect rates | ○ Same as status quo: Rates not being charged to DoD customers, so all DoD customers are treated equally in terms of indirect rates |
| Compliance with laws, policies, and regulations | + Exempted from OUSD(C) guidance to minimize reimbursables<br>– Not compliant with Sec. 232 of FY 2003 NDAA | – Less compliant with OUSD(C) guidance to minimize reimbursables: Increases reimbursables through addition of indirect costs<br>– Not compliant with Sec. 232 of FY 2003 NDAA | ○ Labor and other direct costs are reimbursable<br>○ Reimbursables could be reduced with direct charge, increasing compliance with OUSD(C) guidance to minimize reimbursables | + Most compliant with OUSD(C) guidance to minimize reimbursables |
| One-time transition costs | – Major transition costs to convert to WCF | – Would take some effort to estimate how much money gets transferred and to which customers<br>– Would likely require maturing of indirect cost recovery methods | ○ No impact (status quo) | – Would take some effort to estimate how much money gets transferred and from which customers |
| Ongoing transition costs | – Additional work for financial reporting | – May be minor increase in effort to budget under new indirect cost recovery methods | ○ No impact (status quo) | + No significant ongoing transitions costs or benefits |
| Price impacts on customers | ○ Customers likely pay much more, but how much more is uncertain (depends on IMCOM, LMP, etc. costs) | ○ Customers pay more | ○ No impact (status quo) | ○ Customers pay nothing |

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Stability of customer costs | + Prices would be more predictable within a year<br>– Fluctuations in indirect costs and workload lead to additional year-to-year instabilities in customer prices<br>– Prices could change more across years due to profits/losses | – Fluctuations in indirect costs and workload lead to additional instabilities in customer prices | ○ No impact (status quo)<br>○ Changes in cost to customers continue to reflect changes in direct costs | + Stable; no costs to customer |
| Customer incentives | – Customers may demand less, leading to underutilized capacity and potentially a "death spiral" due to fixed indirect costs being recovered on less workload | + Higher prices better ration demand for capabilities at capacity<br>– Customers may demand less, leading to underutilized capacity and potentially a "death spiral" due to fixed indirect costs being recovered on less workload | ○ No impact (status quo) | – Customers incentivized to overdemand when service is free |
| Adaptability to changes in workload | ○ Similar level of adaptability as the status quo<br>+ Some additional ability to fund capital investments through WCF depreciation charges | + Customers can fund capital investments that benefit them directly<br>+ Increases in direct demand lead to increases in indirect recoveries<br>– Decreases in direct demand lead to decreases in indirect recoveries | ○ Can expand or contract contractor direct workforce in response to changes in demand<br>○ May stress indirect funds or have excess indirect funds as a result of flexing (e.g., there could be large indirect demand in a year when you hired more personnel) | – Need to plan changes to TDA two years in advance<br>– Little adaptability to changes in overall workload in year of execution<br>– Could be difficult to shift workload across different types of capabilities funded by different appropriations<br>+ More responsive to last-minute orders (i.e., less paperwork/ KSDs) |

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Sustainability of low-demand capabilities | – Pressure to divest of underutilized capacities because indirect costs must be recovered over smaller workload; higher prices may drive away more customers<br>+ More ability to divest capabilities not needed in the future | – Pressure to divest of underutilized capacities because indirect costs must be recovered over smaller workload; higher prices may drive away more customers<br>+ More ability to divest capabilities not needed in the future | ○ Can shift personnel onto indirect funding (if changes in appropriations can be planned in advance)<br>○ Appropriations are used to sustain all capabilities in MRTFB, but shortfalls of funding are more likely to impact low-demand capabilities | + As long as you POM for it, everything can be sustained<br>– Susceptible to budget cuts, could lose capabilities |
| Supplier incentives | ○ Similar to (near) full cost recovery<br>+ WCF Capital Investment Program increases ability to fund capital investments from corpus and recover over time using depreciation | + Indirect recoveries from customer may provide additional incentives for suppliers to be responsive<br>– Pressure to divest of underutilized capabilities even if they will be needed in the future<br>+ But easier to ask customers to support those capabilities during periods of underutilization<br>– Can shift costs into indirect rates if appropriations are cut | ○ No impact (status quo) | – No incentive to be responsive to customer<br>– Need prioritization scheme if demand exceeds capacity<br>– Cannot fund overtime<br>– Reduced ability to hire and reassign personnel<br>– More difficult to ask customers to fund capital investments in capacity and capability |
| Use Case #1: Lack of transparency and appropriateness of indirect rates | ○ Similar to (near) full cost recovery<br>+ Must understand how indirect costs benefit the mission<br>+ Stabilized labor rates can control efficiency<br>– More disagreements and winners/losers<br>– Customers lack transparency about indirect costs | – Reduced transparency as customers pay for indirect costs<br>– Indirect cost changes result in winners/losers<br>– Increased customer perceptions of inappropriate costs<br>+ More knowledge of how indirectly funded activities affect mission | ○ Status quo: Relatively straightforward indirect budgeting oversight<br>○ Appropriations are a target for budget cuts | ○ Same as status quo |
| Use Case #2: Lack of transparency in customer-provider transactions | + Exempt from DoD guidance on minimizing reimbursables | – Increases indirect recoveries/transfers | ○ Labor and other direct costs are reimbursable<br>○ Would need to increase direct charges to reduce reimbursable charges | + Eliminates customer-to-provider transfers<br>– Multiple lines of funding still require timekeeping and cost transfers |

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | + Underdisbursement no longer an issue:<br>• Contracts cite cash corpus<br>• Cash corpus absorbs billing lag<br>– Risk of incentivizing Navy model: direct cite contracts and charges customer direct for contract administration | – Would require more contractor cost allocations since more costs would be paid by customers<br>○ Current practices might not be feasible if all of ATEC moved to this model due to a lack of direct appropriations to cite contracts | ○Suppliers obligate appropriated funds to contracts while waiting for customer funds to reimburse contractors<br>○ Causes negative disbursements that distort financial reporting | + Minimizes need for contractor cost allocations<br>– Issues could remain with multiple funding sources |
| Use Case #4: Potential for inappropriate cost transferring | ○ Full WCF has no appropriations to cost transfer to customers<br>– Indirect cost transfers between customers remain inherent risk in full cost recovery<br>– High risk of third-party (e.g., IMCOM) cost transfers that would erode price stability | – If some appropriations remain, lack of transparency in indirect funds allows costs to be shifted to indirect rates if appropriations are cut<br>○ If no appropriations remain, no opportunity to transfer those costs<br>– Indirect cost transfers between customers remain inherent risk in full cost recovery | ○ Few opportunities to cost transfer (e.g., shifting between direct and indirect costs) | + Minimizes ability to cost transfer (impossible with a single source of funding) |

| | Working Capital Fund | (Near) Full Cost Recovery | Appropriations for Indirect Costs (Status quo) | Full Appropriations |
|---|---|---|---|---|
| Use Case #5: Potential subsidies for non-Army customers | + Full cost recovery prevents non-Army subsidies<br>– Incentivizes growing business to reduce indirect rates rather than prioritizing Army<br>– Higher prices may result in reduced workload | + Most costs are recovered from customers, greatly reducing subsidies<br>– Incentivizes growing business to reduce indirect rates rather than prioritizing Army<br>– Higher prices may result in reduced workload | ○ Charges non-Army (e.g., FMS) customers fully loaded costs<br>○ Offers excess capacity at marginal cost<br>○ Can underprice competition out of business leaving Army with sole responsibility (and bills)<br>• Risk is mitigated by MRTFB DoD test centers also having appropriations for indirect costs | ○ Can still charge non-DoD (e.g., FMS) customers fully loaded costs<br>– Offers excess capacity at zero cost, thus increasing subsidies<br>– Could increase pressure to expand capacity if there is surplus demand at zero cost<br>– Increased risk of underpricing competition out of business leaving Army with sole responsibility (and bills)<br>• Undercuts prices of other MRTFB DoD test centers that charge DoD customers for direct costs |

**Table M.4. Evaluation of Alternative Funding Models for ATEC Non-MRTFB Capabilities/RTC**

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Implementation | ○ Approval to get a WCF charter<br>– IT systems and resource management (RM) personnel to track costs and create required financial accounts and budget exhibits<br>○ Supplier's appropriations (operations and capital) would be shifted to customers<br>○ Customers may need to be identified or created for appropriations that fund mission<br>– Difficult to forecast which customers should receive this funding<br>– Cash to shift over to WCF | ○ No impact (status quo) | ○Indirect recoveries from current customers would be shifted to supplier appropriations<br>○ Appropriations would be POM'd two years in advance<br>– Difficult to forecast who all the customers will be two years from now to be able to shift funding | ○ Customer money would be shifted to supplier<br>○ Appropriations would be POM'd two years in advance<br>– Difficult to forecast who all the customers will be two years from now to be able to shift funding |
| Financial auditability | ○ Similar audit requirements as reimbursables (17 KSDs for WCF vs. 18 for reimbursables) | ○ No impact (status quo) | ○ Similar audit requirements since reimbursables and appropriations are still used (but slightly more appropriations transactions to fund indirect costs)<br>+ Fewer dollars are being transferred from customers to suppliers (no indirect recovery allocations) | + Decreased audit requirements compared with reimbursables (18 KSDs for reimbursables vs. 13 for appropriations)<br>+ Dollars do not need to be tracked from customers to suppliers (i.e., eliminates customer KSDs) |
| Transparency: To customer into indirect costs, rates, and processes | ○ Like (near) full cost recovery<br>– Customers usually operate in GFEBS and have less visibility into LMP | ○ Customers have little visibility into indirect costs or reasons for changes in indirect rates | + Customers no longer pay indirect rates, so they do not require transparency | + Customers no longer pay indirect rates, so they do not require transparency |
| Transparency: To HQDA into indirect costs, rates, and processes | + There would be an oversight mechanism that would improve transparency (ARRG) | ○ HQDA has little visibility into indirect costs or reasons for changes | + HQDA centrally manages indirect funding, so indirect budgeting will have to be responsive to them | + HQDA centrally manages indirect funding, so indirect budgeting will have to be responsive to them |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Transparency: Into factors that drive mission costs | + More information about how capital costs contribute to mission | ○ Supplier tracks indirect costs and allocates them to mission projects | – Becomes more difficult to track how indirect costs benefit mission projects | – Becomes more difficult to track individual efforts paid for out of the same appropriation |
| Appropriateness | ○ Similar to status quo since indirect rate structure is similar to status quo<br>– Future customers absorb positive or negative net operating cost | ○ Depends on supplier's indirect rates practices (can be standardized through recommended improvements in Table 6.1) | + Rates not being charged to customers, so all customers are treated equally in terms of indirect rates | + Rates not being charged to customers, so all customers are treated equally in terms of indirect rates |
| Compliance with laws, policies, and regulations | + Exempted from OUSD(C) guidance to minimize reimbursables | ○ Labor and indirect costs are reimbursable<br>○ Would need to increase direct charges to reduce reimbursable charges | + Reduces reimbursable charges | + Most compliant with OUSD(C) guidance to minimize reimbursables |
| One-time transition costs | – Major transition costs to convert to WCF | ○ No impact (status quo) | – Would take some effort (but less than full appropriations) to estimate how much money gets transferred and from which customers | – Would take some effort to estimate how much money gets transferred and from which customers |
| Ongoing transition costs | – Additional work for financial reporting | ○ No impact (status quo) | + Nothing significant | + No significant ongoing transitions costs or benefits |
| Price impacts on customers | ○ Customers likely pay more, but how much more is uncertain (depends on IMCOM, LMP, etc. costs) | ○ No impact (status quo) | ○ Customers pay less | ○ Customers pay nothing |
| Stability of customer costs | + Prices would be more predictable within a year<br>○ Stability from year to year depends on workload and indirect costs remaining relatively constant or changing proportionately<br>– Prices could change more across years due to profits/losses | ○ Depends on workload and indirect costs remaining relatively constant or changing proportionately (e.g., prices could increase if labor costs go up, workload falls while indirect costs remain constant, or more costs are recovered through indirect recoveries) | + No fluctuations due to changes in indirect cost practices<br>– Could change if labor costs or other direct mission costs go up | + Stable; no costs to customer |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Customer incentives | – Customers may demand less, leading to underutilized capacity and potentially a "death spiral" due to fixed indirect costs being recovered on less workload | ○ No impact (status quo) | + Customers may increase demand for underutilized capabilities<br>– Customers may increase demand for capabilities at capacity | – Customers incentivized to overdemand when service is free |
| Adaptability to changes in workload | ○ Similar level of adaptability as the status quo<br>+ Some additional ability to fund capital investments through WCF depreciation charges | ○ Can expand or contract contractor workforce in response to changes in demand<br>○ Customers can fund capital investments that benefit them directly<br>○ Must POM and budget other capital investments | ○ Can expand or contract contractor direct workforce in response to changes in demand<br>– May stress indirect funds, or have excess indirect funds as a result of flexing (e.g., there could be large indirect demand in a year when you hired more personnel) | – Need to plan changes to TDA two years in advance<br>– Little adaptability to changes in overall workload in year of execution<br>– Could be difficult to shift workload across different types of capabilities funded by different appropriations<br>+ More responsive to last-minute orders (i.e., less paperwork/ KSDs) |
| Sustainability of low-demand capabilities | ○ Similar to status quo | ○ Pressure to divest of underutilized capacities because indirect costs must be recovered over smaller workload; higher prices may drive away more customers<br>○ More ability to divest capabilities not needed in the future, relative to MRTFB | + Can shift personnel onto indirect funding (if changes in appropriations can be planned in advance) | + As long as you POM for it, everything can be sustained<br>– Susceptible to budget cuts, could lose capabilities |
| Supplier incentives | ○ Similar to status quo<br>+ WCF Capital Investment Program increases ability to fund capital investments from corpus and recover over time using depreciation | ○ Need to be responsive to customers to get funding<br>○ Pressure to divest of underutilized capabilities<br>○ Can shift costs into indirect rates if appropriations are cut | – Suppliers might not be as responsive if not earning indirect recoveries from customers<br>– More difficult to ask customers to fund capital investments in capacity and capability | – No incentive to be responsive to customer<br>– Need prioritization scheme if demand exceeds capacity<br>– Cannot fund overtime<br>– Reduced ability to hire and reassign personnel<br>– More difficult to ask customers to fund capital investments in capacity and capability |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Use Case #1: Lack of transparency and appropriateness of indirect rates | + Must understand how indirect costs benefit the mission<br>+ Stabilized labor rates can control efficiency<br>– More disagreements and winners/losers<br>– Customers lack transparency about indirect costs | ○ Depends on supplier's indirect rates practices and how well they are communicated to customers<br>○ Could be improved through recommended improvements (Table 6.1) | + Simplifies indirect budgeting oversight<br>– Less knowledge of how indirectly funded activities affect mission<br>– Could be a target for budget cuts | + Simplifies indirect budgeting oversight<br>– Less knowledge of how indirectly funded activities affect mission<br>– Could be a target for budget cuts |
| Use Case #2: Lack of transparency in customer-provider transactions | + Exempt from DoD guidance on minimizing reimbursables | ○ Labor and indirect costs are reimbursable<br>○ Would need to increase direct charges to reduce reimbursable charges | + Eliminates reimbursable indirect recoveries<br>– Does not eliminate reimbursable civilian labor costs | + Eliminates customer to provider transfers<br>– Multiple lines of funding still require timekeeping and cost transfers |
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | + Underdisbursement no longer an issue:<br>• Contracts cite cash corpus<br>• Cash corpus absorbs billing lag<br>– Risk of incentivizing Navy model: direct cite contracts and charges customer direct for contract administration | ○ Suppliers obligate appropriated funds to contracts while waiting for customer funds to reimburse contractors<br>○ Causes negative disbursements that distort financial reporting | + Would require fewer contractor cost allocations since more costs would be paid by appropriations | + Minimizes need for contractor cost allocations<br>– Issues could remain with multiple funding sources |
| Use Case #4: Potential for inappropriate cost transferring | + Full WCF has no appropriations to cost transfer to customers<br>– Indirect cost transfers between customers remain inherent risk in full cost recovery<br>– High risk of third-party (e.g., IMCOM) cost transfers that would erode price stability | ○ Lack of transparency in indirect funds allows costs to be shifted to indirect rates if appropriations are cut | + Cannot increase indirect rates when appropriations decrease<br>– Double billing more likely to occur for same service | + Minimizes ability to cost transfer (impossible with a single source of funding) |

| | Working Capital Fund | (Near) Full Cost Recovery (Status quo) | Appropriations for Indirect Costs | Full Appropriations |
|---|---|---|---|---|
| Use Case #5: Potential subsidies for non-Army customers | + Full cost recovery prevents non-Army subsidies<br>– Incentivizes growing business to reduce indirect rates rather than prioritizing Army<br>– Higher prices may result in reduced workload | ○ Most costs are recovered from customers<br>○ Paying for capital investments with appropriated funds could create subsidies for non-Army customers | + Ability to charge non-Army (e.g., FMS) customers fully loaded costs<br>+ Offers excess capacity at marginal cost<br>– Can underprice competition out of business leaving Army with sole responsibility (and bills)<br>• Risk is mitigated by MRTFB DoD test centers also having appropriations for indirect costs | + Ability to charge non-Army (e.g., FMS) customers fully loaded costs<br>+ Offers excess capacity at zero cost<br>– Could increase pressure to expand capacity if there is surplus demand at zero cost<br>– Can underprice competition out of business leaving Army with sole responsibility (and bills) |

**Table M.5a. Evaluation of Potential Improved Accounting Methods**

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Implementation | • Could stand up an indirect rates board to review indirect costs and collection methods<br>• Could put neutral parties at HQ ATEC RDECOM who would facilitate discussions between ATEC/RDECOM and customers<br>• Need early involvement in rate-setting process to allow time to influence indirect costs and avoid becoming a "rubber stamp" | • Document what indirect costs are paid by customers vs. appropriations<br>• Non-MRTFB/RDECOM: Document the names, purpose, and indirect recovery methods for all indirect cost pools | • Clarify policies about which indirect costs are paid by customers and which indirect costs are paid by appropriations<br>• Rebalance ATEC/RDECOM appropriations as necessary to align with policy<br>• MRTFB: Policies developed in response to Section 232 of FY 2003 NDAA already help ensure consistency | • Rebalance appropriations to RDECOM customers |
| Financial auditability | + Demonstrates increased control over indirect costs | + Enables audits of indirect cost processes: Auditors can compare disclosure to policies and laws to ensure disclosure is legal, and auditors can compare actual practice to disclosure to ensure compliance | + May safeguard against Anti-Deficiency Act use violations by instilling discipline in how different sources of funds are used | + May safeguard against Anti-Deficiency Act use violations by instilling discipline in how different sources of funds are used |
| Transparency: To customer into indirect costs, rates, and processes | + The rates board and/or neutral party interface would require that suppliers proactively provide customers with information about indirect rates and processes and be responsive to questions | + Increased customer knowledge of indirect cost policies and processes<br>+ Increased trust that customers are treated equitably<br>+ Increased transparency to customers about policy changes (e.g., addition of a new cost pool would require modifying disclosure) | + Customers develop a consistent understanding of which indirect costs they pay<br>– Third parties (e.g., IMCOM) may continue transferring costs that will be passed onto customers | + Customers develop a consistent understanding of which indirect costs they pay<br>– Third parties (e.g., IMCOM) may continue transferring costs that will be passed onto customers |

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Transparency: To HQDA into indirect costs, rates, and processes | + The rates board and/or neutral party interface would require that suppliers proactively provide HQDA with information about indirect rates and processes and be responsive to questions | + HQDA will have knowledge of indirect cost policies and processes<br>+ Increased trust that customers are treated equitably<br>+ HQDA could conduct audits of indirect cost processes to judge whether actual practices match disclosed practices and judge whether disclosed practices are compliant with laws and policy | + Consistency is easier to understand and more transparent | + Lack of indirect appropriations reduces complexity and increases transparency |
| Transparency: Into factors that drive mission costs | + Justification of indirectly funded efforts and costs to the rates board or neutral party interface would likely require suppliers to link indirectly funded efforts to mission benefits | + Justification for changes to cost accounting practices should include information on relationship between indirect and mission costs | | |
| Appropriateness | + Customer involvement in indirect budgeting is likely to make suppliers more aware of customer concerns about inappropriate charges<br>+ Indirect rates board or a neutral party interface can help individual customers understand the bigger picture and need for indirect costs that might not necessarily benefit that particular customer | + Disclosure of policies allows customers and HQDA to more easily evaluate appropriateness (i.e., disclosure would make it easier to identify if practices discriminated against a customer) | + Ensures that appropriations and indirect recoveries are used as intended | + Prevents inappropriate cost transferring by RDECOM |

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Compliance with laws, policies, and regulations | + Increases customer and HQDA input into budgeting process that can more quickly raise concerns about violations of laws, policies, and regulations | + Disclosure facilitates reviews of supplier policies and practices to ensure they are compliant | + Consistency of funding costs is usually required in policy | |
| One-time transition costs | – Costs of establishing board or position for neutral party | – Requires the development of a disclosure, which will require personnel time | – Likely requires rebalancing indirect appropriations for indirect operations | – Requires rebalancing indirect appropriations for indirect operations |
| Ongoing transition costs | – An indirect rates board would increase demands on command, customer, and HQDA personnel<br>– A neutral party interface would create a new manpower requirement<br>+ Greater involvement of customers and HQDA should increase efficiency and effectiveness of indirect costs<br>+ Greater involvement of customers and HQDA should create additional trust, which may lower unproductive disagreements | – Disclosure will need to be updated as policies change, requiring personnel time | | |

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Price impacts on customers | + Customer/HQDA involvement should pressurize indirect costs and incentivize efficiency, leading to lower prices | + Provides better visibility of what is included in prices but would not directly change prices | ○ Customers could pay more or less depending on how indirect appropriations were rebalanced<br>+ Cuts to indirect appropriations would be more likely to lead to reductions in indirect activities instead of increases in indirect costs to customers<br>– Risk: if too much is cut or wrong cuts are made, lack of flexibility in indirect funds could lead to decreased efficiency or increase direct costs<br>– Third parties (e.g., IMCOM) could continue passing costs thus raising customer prices | ○ Customers would pay slightly more<br>– Third parties (e.g., IMCOM) could continue passing costs thus raising customer prices |
| Stability of customer costs | + Customer/HQDA involvement would likely be especially vigilant and guard against fluctuations in prices | + Prevents year-to-year changes in indirect cost policies that can create unexpected price fluctuations | + Reduces opportunities to increase indirect rates to customers to make up for lost indirect appropriations<br>– Does not eliminate fluctuations in indirect costs caused by third parties (e.g., IMCOM) from passing new costs | + Eliminates opportunities to increase indirect rates to customers to make up for lost indirect appropriations<br>– Does not eliminate fluctuations in indirect costs caused by third parties (e.g., IMCOM) from passing new costs |
| Customer incentives | + Decreased prices and increased efficiency could lead to increased demands from customers | | + Reduces supplier's ability to shift fixed indirect costs currently paid by appropriations to customers (i.e., keeps customer prices closer to marginal cost, preventing underutilized capacity) | – Will shift cost of fixed indirect costs to customers (i.e., customer prices are further from marginal cost, increasing risk of underutilized capacity) |

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Adaptability to changes in workload | + Provides HQDA and customer with an opportunity to obtain concurrence on need for changes in workforce size and composition and new capital investment | – Significant changes may require changes to indirect cost policies, which requires changing disclosure<br>+ Increased transparency of changes may enable faster changes | | |
| Sustainability of low-demand capabilities | + Could increase knowledge about customers' long-term needs<br>+ Could increase customers' concurrence about need to pay for underutilized capabilities<br>+ Could lead to increased concurrence from HQDA about need to fund underutilized capabilities with appropriations | | + More difficult to shift funding intended to maintain underused capabilities to other purposes | – Could eliminate BA 6.6 appropriations used to fund low-demand capabilities or put more pressure to cut indirect costs associated with these capabilities |
| Supplier incentives | + Involvement of customers encourages better planning, reduced costs, and increased efficiency<br>+ Incentivizes increased responsiveness to customers and HQDA | + Prevents suppliers from "gaming" indirect recovery policies to make up for yearly fluctuations in funding | + Decreases ability of supplier to transfer costs between appropriations, customer-funded indirect costs, and mission funding | + Decreases ability of supplier to transfer costs between appropriations, customer-funded indirect costs, and mission funding |
| Use Case #1: Lack of transparency and appropriateness of indirect rates | + Customer/HQDA involvement requires increases in transparency<br>+ Customer/HQDA oversight likely to better ensure indirectly funded activities are appropriate | + Disclosure increases transparency<br>+ Increased transparency likely leads to increased appropriateness | + Improves customer understanding of what indirect costs they fund vs. what indirect costs are funded through appropriations | + Improves customer understanding of what indirect costs they fund vs. what indirect costs are funded through appropriations |
| Use Case #2: Lack of transparency in customer-provider transactions | | | | |

| | 1. Customer/HQDA involvement in indirect budgeting | 2. Disclosure of cost accounting practices | 3. Consistency of funding indirect costs | 4. Eliminate RDECOM's BA 6.6 appropriations |
|---|---|---|---|---|
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | | | | |
| Use Case #4: Potential for inappropriate cost transferring | + Customer/HQDA involvement helps prevent inappropriate cost transferring<br>+ Customer-supplier coordination helps identify inappropriate third-party cost transferring (especially relevant to matrixing; e.g., charging both RDECOM and customer for costs due to matrixed labor) | + Cost accounting practices will establish how appropriations should be used, which may help prevent inappropriate cost transferring | + Consistency in how appropriations are used better ensures that when indirect appropriations are cut, activities are curtailed instead of having unfunded costs passed to customers<br>– Does not protect against cost transfers from third parties (e.g., IMCOM) | + Eliminates risk that RDECOM can engage in inappropriate cost transferring on its BA 6.6 appropriations<br>– Does not protect against cost transfers from third parties (e.g., IMCOM) |
| Use Case #5: Potential subsidies for non-Army customers | | | | |

**Table M.5b. Evaluation of Potential Improved Accounting Methods**

| | 5. Standardize DD 1144 reporting | 6. Indirect budget methods in guidance documents | 7. RTC creates guidance documents | 8. Indirect rate base includes contractor support |
|---|---|---|---|---|
| Implementation | • ATEC (especially RTC) and RDECOM work together to provide a standard report showing indirect costs paid by customers and how indirect rates are determined | • ATEC: Indirect rate policies in ATEC 37–11<br>• ATEC: Add details on indirect budgeting process to ATEC 37–11<br>• AMC CONOPS sets policies for indirect cost practices across RDECOM<br>• AMC CONOPS would need to be amended to standardize budgeting processes | • Non-MRTFB/RTC needs to create formal documentation (since RTC's methods are similar to AMC CONOPS, RTC could adopt its terminology) | • ATEC: Largely inapplicable for ATEC; ATEC applies indirect rates to both civilian and contractor labor hours<br>• RDECOM: Could levy indirect rates on contractor support personnel (likely as a percentage of costs since RDECOM contracts do not report DLHs) |
| Financial auditability | + Facilitates concurrence on DD 1144s, reducing unsigned agreements | + Improves rigor of financial processes and documentation, improving auditability | + Improves rigor of financial processes and documentation, improving auditability | |
| Transparency: To customer into indirect costs, rates, and processes | + Reduces confusion and facilitates conversations about issues like scope and level of effort | + Customers would better understand the budgeting process<br>+ RDECOM: Further evolution and further adoption of AMC CONOPS, which will likely increase customers' understanding of RDECOM's indirect structure and budgeting processes over time | + Customers would better understand the budgeting process<br>+ Non-MRTFB: Customers who are familiar with AMC CONOPS would have a better understanding of RTC's indirect recovery structure if RTC adopted the same terminology | + RDECOM: Reduces artificial cost discrepancies between civilian and contractor labor |

| | 5. Standardize DD 1144 reporting | 6. Indirect budget methods in guidance documents | 7. RTC creates guidance documents | 8. Indirect rate base includes contractor support |
|---|---|---|---|---|
| Transparency: To HQDA into indirect costs, rates, and processes | + Increased standardization of reporting creates a familiar set of metrics and facilitates HQDA understanding | + HQDA would better understand the rhythm of the budgeting process<br>+ RDECOM: Further evolution and further adoption of AMC CONOPS, which will likely increase HQDA understanding of RDECOM's indirect structure and budgeting processes over time | + Using a common set of terminology (i.e., AMC CONOPs) would improve HQDA understanding | |
| Transparency: Into factors that drive mission costs | + Improves visibility into tiered indirect rates that are linked to mission costs | | | |
| Appropriateness | + DD 1144s currently show total indirect costs; customers may calculate indirect rates from these costs and incorrectly conclude that customers are charged a unique indirect rate on each effort, even when customers and efforts are charged a common set of rates and common set of policies | | | + RDECOM: Indirect recoveries on contractor labor would increase appropriateness of indirect rates because contractors also generate and benefit from indirect spending; e.g., on-site contractors benefit from having a workspace |
| Compliance with laws, policies, and regulations | + Standard reporting could reduce unsigned DD 1144s, which increases compliance | + Standardization of budgeting process better ensures compliance | | |
| One-time transition costs | – Requires coordination (i.e., personnel time) among Army entities that charge indirect rates and customers to standardize reports<br>– Automation of reports may require additional software/ERP investments | – Requires development of new policies and policy documents that will have a cost in personnel time and funding if contracted | – Requires development of new policies and policy documents that will have a cost in personnel time and funding if contracted | |

| | 5. Standardize DD 1144 reporting | 6. Indirect budget methods in guidance documents | 7. RTC creates guidance documents | 8. Indirect rate base includes contractor support |
|---|---|---|---|---|
| Ongoing transition costs | – Reports will create an additional burden on personnel time beyond the already burdensome time required by DD 1144s<br>+ However, standard reports can be automated (e.g., RTC automates reports of estimated test costs and execution) | – Increased formality of budgeting methodologies could require additional management time | | – RDECOM: It would increase burdens on RDECOM and DASA-CE when filling out cost sheets and entering contractor indirect rates into GFEBS |
| Price impacts on customers | + Provides better visibility of what is included in prices but would not directly change prices | | | + RDECOM: Neutral in aggregate but would likely reduce prices to DAC-heavy activities like matrixing and increase prices to contractor-heavy activities |
| Stability of customer costs | + Increased visibility may limit supplier discretion to change indirect cost policies, leading to greater stability | | | + RDECOM: Fluctuations in personnel composition would lead to less variation in costs |
| Customer incentives | | | | + RDECOM: Reduces customer requests to "game" system by requesting cheaper contractors on their projects |
| Adaptability to changes in workload | + Improved reporting should reduce delays in signing DD 1144s that occur due to confusion and disagreements over costs | | | |
| Sustainability of low-demand capabilities | | | | |
| Supplier incentives | + Encourages supplier efficiency in the metrics that are included in the reporting template since they are highly visible to customers | + Rigorous budgeting process encourages better planning, reduced costs, and increased efficiency | | + RDECOM: It would encourage suppliers to compose teams that are most efficient rather than composing teams with contractors who are artificially cheap |

| | 5. Standardize DD 1144 reporting | 6. Indirect budget methods in guidance documents | 7. RTC creates guidance documents | 8. Indirect rate base includes contractor support |
|---|---|---|---|---|
| Use Case #1: Lack of transparency and appropriateness of indirect rates | + Improved reporting provides customers with an improved understanding of what costs they are paying and whether they are appropriately allocated | + Rigorous, standardized methodologies improve transparency of practices across the Army | + Improves transparency of RTC's policies<br>+ RTC adoption of AMC/RDECOM terminology helps standardize reimbursable practices across Army | + Bases other than labor can ensure that indirect recoveries are more appropriately collected from customers and efforts that benefit from or generate indirect costs<br>– Bases other than labor can increase complexity of indirect recoveries, which can reduce transparency<br>+ RDECOM: Recovering indirect costs from contractor labor improves appropriateness |
| Use Case #2: Lack of transparency in customer-provider transactions | | | | |
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | | | | |
| Use Case #4: Potential for inappropriate cost transferring | | | | |
| Use Case #5: Potential subsidies for non-Army customers | | | | |

**Table M.5c. Evaluation of Potential Improved Accounting Methods**

| | 9. Increased granularity in indirect budgets | 10. Increased direct charge | 11. Self-MIPRs for contractor cost allocations |
|---|---|---|---|
| Implementation | • Budget and track execution in GFEBS at an increased level of granularity (e.g., ATEC currently implementing statistical internal orders) | • In the near term, HQDA efforts are required to standardize practices across the Army<br>• In the long term, HQDA efforts are required to improve GFEBS and/or reporting processes so that direct charges are the standard for reimbursables | • ATEC near term: Allow ATEC to cite contracts using automatic funding (subject to auditability approval)<br>• ATEC near-term alternative: Use contract mods (like RDECOM) instead of contractor cost allocations<br>• ATEC long term: ATEC and HQDA should seek alternative, long-term solutions that do not use self-MIPRs (e.g., consolidated accounts)<br>• RDECOM: N/A (does not use contractor cost allocations) |
| Financial auditability | + Demonstrates increased control over indirect costs | + Eliminations to remove double counting are not necessary<br>– Without improvements in management rights in GFEBS, customers can potentially deobligate funding from suppliers without notice leading suppliers to expend costs without funding | – ATEC: Concerns that auditors will raise issues with self-MIPRs<br>– ATEC: Self-MIPRs can potentially create double counting that requires eliminations |
| Transparency: To customer into indirect costs, rates, and processes | + Increased granularity increases customers' ability to monitor and understand execution<br>– Non-MRTFB: Indirect recovery policies may become more complex (e.g., increased numbers of cost pools) | + Customers can more easily see how suppliers are spending their funds within GFEBS<br>+ Rather than a cost transfer, GFEBS shows how supplier is charging over different categories of cost | |

| | 9. Increased granularity in indirect budgets | 10. Increased direct charge | 11. Self-MIPRs for contractor cost allocations |
|---|---|---|---|
| Transparency: To HQDA into indirect costs, rates, and processes | + HQDA would have an increased ability to understand execution of indirect budget | + Costs appear once (on customer's funding) rather than twice on both the customer's and supplier's funding<br>– Without Army-wide reporting standards for direct charge, HQDA must learn each command's practices to correctly attribute each command's personnel to the work; otherwise, HQDA will incorrectly attribute labor to the customer | + ATEC: HQDA no longer sees artificial underdisbursement of ATEC's appropriations<br>– ATEC: Obligations and disbursement to contractors may be more difficult to track when performed on a self-reimbursement WBS |
| Transparency: Into factors that drive mission costs | + Disaggregates indirectly funded efforts; there is an increased ability to identify the benefits and costs of the indirectly funded effort, including how the efforts impact the mission and its costs | | |
| Appropriateness | + Rigorous methodologies can better support more complex indirect recovery structures that more appropriately link indirect costs to the projects/customers that benefit from or cause those costs | – Without improvements in management rights, indirect rates can potentially be manipulated by the customer | |
| Compliance with laws, policies, and regulations | | + Increases compliance with OUSD(C) guidance to minimize reimbursables to reduce reimbursable civilian labor<br>– Does not completely eliminate reimbursable civilian labor | – ATEC: self-MIPRs for contractor cost allocations would require a waiver from current policy<br>– ATEC: Army is moving toward eliminating self-MIPRs, making a waiver unlikely |
| One-time transition costs | – Requires training and planning time to implement increased granularity (e.g., structuring of indirect WBS) | – May require policy changes (e.g., ongoing DASA-FO efforts) to improve reporting and management rights of funding<br>– May require investments in GFEBS to implement reporting and ensure management rights are respected | – ATEC: Longer-term alternatives require additional study (e.g., DASA-FO efforts)<br>– ATEC: Longer-term alternatives could require investments (e.g., changes to GFEBS)<br>+ Compared with contract modifications, fewer costs since ATEC believes it would need to hire more personnel to emulate RDECOM's practices |

| | 9. Increased granularity in indirect budgets | 10. Increased direct charge | 11. Self-MIPRs for contractor cost allocations |
|---|---|---|---|
| Ongoing transition costs | – May increase complexity of indirect budgeting and monitoring of execution<br>– Complicates budgeting time for indirect personnel (e.g., more time-card entries)<br>+ More rigorous methodologies should increase efficiency and effectiveness of indirect costs | – May require additional monitoring by suppliers to ensure that customers are not modifying available funds or indirect rates | ○ ATEC: Similar to the status quo<br>+ ATEC: Compared with contract modifications, no costs for additional personnel and increased work effort |
| Price impacts on customers | + Increased rigor should lead to reduction in overhead/increase in efficiency | | ○ ATEC: Similar to the status quo<br>+ ATEC: Compared with contract modifications, self-MIPRs avoid additional contracting costs that may be paid by customers |
| Stability of customer costs | + Increased rigor should guard against fluctuations in indirect costs | | |
| Customer incentives | +Decreased prices and increased efficiency could lead to increased demands from customers | – Without improvements in management rights, customers can pull funding and manipulate indirect rates surreptitiously | ○ ATEC: Similar to the status quo<br>+ ATEC: Compared with contract modifications, the lower cost may increase demand |
| Adaptability to changes in workload | + Increased rigor could increase confidence in need (or lack of need) for changes in indirect workforce size and composition and new capital investment | – Without improvements to direct charge reporting, workforce could be attributed incorrectly, complicating hiring | ○ ATEC: Similar to the status quo<br>+ ATEC: Compared with contract modifications, it would be faster to put contractors on tests, avoiding delays |
| Sustainability of low-demand capabilities | + Increased rigor could improve long-term planning, which could improve ability to protect underutilized capabilities that will be needed in the future | | |
| Supplier incentives | + Adds rigor to budgeting and execution monitoring processes encouraging better planning, reduced costs, and increased efficiency | | |
| Use Case #1: Lack of transparency and appropriateness of indirect rates | + Increased transparency likely leads to increased appropriateness | + Increases visibility to customers in GFEBS about how much they are charged for indirect recoveries | |

| | 9. Increased granularity in indirect budgets | 10. Increased direct charge | 11. Self-MIPRs for contractor cost allocations |
|---|---|---|---|
| Use Case #2: Lack of transparency in customer-provider transactions | | + Reduces reimbursable civilian labor, better complying with OSD guidance<br>– Does not eliminate reimbursable civilian labor (e.g., remains on project orders)<br>+ Increases transparency of costs to customers<br>– If reporting is not fixed, results in incorrect attribution of labor<br>– If management rights of funding are not fixed, can lead to indirect rates being inappropriately manipulated by customers | |
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | | | + ATEC: Self-MIPRs would fix use case<br>○ ATEC: Contract modifications would also fix use case<br>– ATEC: Auditability of self-MIPRs is in doubt<br>– ATEC: Feasibility of other alternatives to self-MIPR (e.g., consolidated accounts) is unknown |
| Use Case #4: Potential for inappropriate cost transferring | | | |
| Use Case #5: Potential subsidies for non-Army customers | | | |

# Appendix N. Potential Hybrid and Dual-Funded Working Capital Fund Approaches

A WCF can potentially fund—at least partially—any combination of alternatives that includes reimbursable direct costs from customers. The strengths and weaknesses of the alternatives that were identified in the previous matrices largely apply to any combination of funding models. The following analysis discusses potential dual-funded and hybrid WCF models. As in Appendix M, the study team conducted an analysis of the strengths, weaknesses, and implementation requirements required for more complex combinations of WCF alternatives.

## Dual-Funded Working Capital Fund Models

FMR, vol. 2B (090107N) sets policy for activities that are funded out of both a WCF and appropriations. Dual-funded activities are funded initially either through a WCF or appropriations depending on which activity possesses the "preponderance" of activity. We assume organizations would only transfer to the WCF if they could meet this preponderance of activity standard. Otherwise, the organization's activities would be funded through appropriations, but reimbursement from customers would go from customer orders to LMP that the organizations would transfer to GFEBS to fund their costs. Therefore, implementing a WCF where the preponderance of activity was funded by appropriations would create impediments to transparency and auditability.

If organizations do not have a preponderance of activity in the WCF, then it is potentially feasible to divide the organization into a WCF portion and an appropriated portion. We did not examine this option in detail, since it would require substantial reorganization and could potentially lead to many transfers of funds between LMP and GFEBS. For example, if an engineer who normally works on appropriated funds (GFEBS) were to perform work for a customer through the WCF (LMP), then the engineer's payroll would be paid initially by appropriations, but a cost transfer from LMP to GFEBS would be required so that the WCF could reimburse the appropriations.

In our discussions, AMC indicated limitations in GFEBS and LMP would make it difficult to fund initially all costs out of the WCF. The Army's Tank-Automotive and Armaments Command (TACOM) and Communications-Electronics Command both operate as dual-funded organizations, yet the appropriated portions operate out of GFEBS and the WCF portions operate out of LMP. AMC says the links between GFEBS and LMP have to be operated manually—there is no automated solution. Further, transactions between GFEBS and LMP incur bills from DFAS, which are priced on a per-transaction basis. In addition to the costs of transacting between GFEBS and LMP, AMC told us reconciling labor costs across GFEBS and LMP is so

difficult that AMC strictly segregates personnel funded by appropriations within GFEBS and personnel funded by the WCF within LMP—generally, no crossover is allowed. We have not estimated in detail the changes required within GFEBS and LMP as well as process changes necessary to integrate the systems to allow all costs to be initially funded by the WCF, as envisioned by the FMR. However, we note that these changes and uncertainty are a negative factor in transitioning to a dual-funded model.

## Two Potential Paths for RDECOM

The study team identified two WCF models that could be implemented at RDECOM:

1. **Pure WCF**. The most straightforward way of putting RDECOM into a WCF is by converting all RDECOM activities to full cost recovery from customers. Appropriations that RDECOM currently receives (most notably, S&T funding) would be appropriated to a "customer" instead, who would create an order from the WCF. The Navy uses this model for its labs and warfare centers. For example, Navy S&T funding is appropriated to the Naval Research Office, which can order work from the NRL or the warfare centers.
2. **Dual-Funded WCF**. A dual-funded WCF alternative that appears feasible for some RDECOM organizations, if GFEBS and LMP are better integrated, is to move RDECOM's customer-reimbursable activities to the WCF while retaining the appropriated funding model for current appropriations. This model would be similar to RDECOM's status quo, because appropriations would continue to be charged indirect rates that would fund an appropriate share of RDECOM's indirect costs.

Table N.1 shows RDECOM's current breakdown of funding (top) and civilian DLH (bottom) for all of RDECOM's organizations. Some of the organizations (AMRDEC, ARDEC, and ECBC) appear to meet the criteria for having a preponderance of direct funding and DLH funded through reimbursables, so they would be candidates for a dual-funded WCF that included current reimbursables but kept appropriations outside of the WCF. However, two organizations (ARL, NSRDEC) have a clear preponderance of activity funded through appropriations, and two organizations are mixed (CERDEC and TARDEC). This means that it is unlikely that all RDECOM organizations could transition to the dual-funded WCF model.

**Table N.1. RDECOM Obligations and Civilian Mission Hours, by Funding Source, FY 2017 ($Millions)**

| | HQ | AMRDEC | ARDEC | ARL | CERDEC | ECBC | NSRDEC | TARDEC | Total |
|---|---|---|---|---|---|---|---|---|---|
| Approp. obl. | 120.2 | 462.1 | 249.2 | 782.1 | 524.8 | 72.8 | 183.0 | 311.3 | **2,705.5** |
| Reimb. obl. | 5.3 | 740.2 | 1,124.8 | 347.8 | 276.8 | 222.7 | 109.7 | 154.5 | **2,981.7** |
| Reimb. obl. % | 4% | 62% | 82% | 31% | 35% | 75% | 37% | 33% | **52%** |
| Approp. hour | 0.3 | 0.9 | 1.2 | 1.8 | 1.2 | 0.2 | 0.5 | 0.9 | **7.1** |
| Reimb. hour | 0.0 | 3.8 | 3.6 | 1.2 | 1.9 | 1.4 | 0.4 | 1.4 | **13.7** |
| Reimb. hour % | 12% | 80% | 75% | 40% | 61% | 88% | 48% | 61% | **66%** |

SOURCE: Analysis of RDECOM data provided on December 18, 2017.
NOTES: Table excludes funds spent on indirect costs and indirect labor hours.
HQ = headquarters; AMRDEC = Aviation and Missile Research, Development, and Engineering Center; ARDEC = Armament Research, Development, and Engineering Center; ARL = Army Research Laboratories; CERDEC = Communications-Electronics Research, Development, and Engineering Center; ECBC = Edgewood Chemical Biological Center; NSRDEC = Natick Soldier Research Development, and Engineering Center; TARDEC = Tank Automotive Research, Development, and Engineering Center.

## Three Potential Paths for ATEC

Moving ATEC test centers to the WCF would be more complex. The primary challenge to such a move is that any WCF model the study team posited would require policy changes, either to MRTFB funding rules or to WCF rules in the FMR. The study team identified three WCF alternatives, but given the uncertainty of how policies would change, these alternatives are more notional than the RDECOM options:

1. **Pure WCF**. WCF policies usually require that activities within a WCF be full cost recovery (i.e., direct costs are paid by reimbursables from customers and indirect costs are paid by indirect rates charged to direct costs). ATEC's MRTFB activities are not compatible with this full cost recovery model due to requirements in Section 232 of the FY 2003 NDAA that require each service to fund the institutional/indirect costs of MRTFBs. Therefore, significant changes in laws would be necessary to fund ATEC's MRTFBs through a full cost recovery WCF.
2. **MRTFB Appropriations within WCF**. In less common cases, WCFs can accept appropriations, for example, through the Arsenal Sustainment Initiative.[1] ATEC MRTFB activities could potentially be funded with appropriations for indirect costs, provided that Congress appropriated funds to the WCF and the OSD director of revolving funds approved.
3. **Dual-Funded WCF**. Finally, ATEC could operate its current MRTFBs using a dual-funded approach, where MRTFB activities would be funded outside the WCF and non-MRTFB activities would be funded within the WCF. Given that nearly all of the activities occurring within ATEC's test centers, with the exception of RTC, are within the

[1] WCFs typically only receive appropriations to fund increases in the corpus. However, policies for accepting appropriations into WCFs for other reasons are covered by FMR policy (see FMR, vol. 3, Ch. 19 [190202D2]).

MRTFB, this alternative implies that some of ATEC's MRTFB capabilities that are at or near full utilization would need to be removed from the MRTFB to meet the FMR requirements to initially fund the entire organization out of the WCF. Removing these capabilities from the MRTFB would require policy changes, since DoDI 3200.18 (Management and Operation of the Major Range and Test Facility Base [MRTFB]), which governs changes in the composition of MRTFBs, does not include provisions for removing healthy capabilities.

Unlike RDECOM, which receives substantial portions of funding for mission activities from both appropriations and customer reimbursables, ATEC's test centers receive nearly all funding for mission activities from reimbursables. Therefore, it is clear that the test centers meet the preponderance criterion. A dual-funded model like the one posited above for RDECOM would not be useful for ATEC since they receive a small percentage of their mission operational funding from appropriations. The dual-funded approach posited for ATEC (above) would remove capabilities from the MRTFB and require a preponderance of the direct activity be funded from outside the MRTFB to qualify. Such an analysis would be similar to the RDECOM analysis shown in Table N.1.

## Evaluation of Alternative Working Capital Fund Approaches

Table N.2 presents the study team's analysis of the relative merits of the dual-funded and hybrid WCF models relative to the pure WCF models assessed in Appendix M.

The study team did not pursue exploring these options in any additional detail (i.e., we did not include them in the main report). We concluded these models are unattractive for three reasons.

First, the commands believe the issues related to the integration of GFEBS and LMP provide a number of obstacles to implementing these more complex WCF models. In our review of the Navy's policies, we found that the Navy commonly uses Navy ERP for both WCF and appropriated activities, and consequently integration of ERPs was not a hurdle to operating dual-funded WCFs in their labs with MRTFBs. A substantial effort would need to occur to fully map out these limitations and a path forward for improving the systems to overcome the limitations.

Second, all of the ATEC WCF options would require substantial policy changes, and these would likely have to occur alongside more in-depth planning for a dual-funded or hybrid WCF.

Third, the study team recommended against either command adopting the WCF. The hybrid and dual-funding approaches have some potential advantages over the pure WCF approaches, but when considered with the drawbacks of these complex approaches and the drawbacks of the WCF in general, do not warrant deeper consideration now.

If the Army gives more serious consideration to moving toward a WCF in the future for RDECOM or ATEC's funding, it may be useful to explore these hybrid and dual-funded approaches in more detail.

**Table N.2. Evaluation of Potential Hybrid Working Capital Fund Models**

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Implementation | ○ Approval to get a WCF charter.<br>○ IT systems and RM personnel to track costs and create required financial accounts and budget exhibits<br>○ Supplier's appropriations (operations and capital) would be shifted to customers<br>○ Difficult to forecast which customers should receive this funding<br>○ Cash to shift over to WCF<br>○ Requires rescinding Sec. 232 of FY 2003 NDAA for MRTRB funding rules | ○ Shift annual MRTFB institutional appropriations from RDT&E to WCF<br>○ MRTFB appropriations would be treated as miscellaneous revenue<br>– Congress would need to approve of shift of appropriations to WCF<br>– Army does not request appropriations that violate full cost recovery policy of the WCF (e.g., the Arsenal Sustainment Initiative is Congressionally driven)<br>– WCF price stabilization provides a price ceiling but not a floor (ATEC may need to adjust MRTFB prices downward to avoid making profits to comply with Sec. 232 of FY 2003 NDAA)<br>+ Does not require rescinding Sec. 232 of FY 2003 NDAA | – Change DoD policy to allow healthy capabilities to be removed from the MRTFB<br>– Receive approval from TRMC to remove capabilities from MRTFB<br>○ WCF can initially fund all costs (assuming majority of activity, e.g., DLHs) is in WCF<br>– LMP and GFEBS need improvements to allow WCF to initially fund all costs; extent of improvement is unknown<br>○ ATEC would receive appropriations in GFEBS for institutional costs and transfer funds to LMP to reimburse costs initially funded from WCF<br>+ Does not require rescinding Sec. 232 of FY 2003 NDAA | + Would not require the creation of customers for RDECOM's current appropriations<br>○ WCF can initially fund all costs (assuming majority of activity, e.g., civilian DLHs) is in WCF<br>– LMP and GFEBS need improvements to allow WCF to initially fund all costs; extent of improvement is unknown<br>○ RDECOM orgs would receive appropriations in GFEBS and transfer funds to LMP to reimburse costs initially funded from WCF |
| Financial auditability | ○ See "Working Capital Fund" columns in previous tables | + Fewer audit requirements with appropriations (13 KSDs vs. 17 in WCF)<br>– If GFEBS is retained, working between GFEBS and LMP is manual and could lead to errors | + Fewer audit requirements with appropriations (13 KSDs vs. 17 in WCF)<br>– If GFEBS is retained, working between GFEBS and LMP is manual and could lead to errors | + Fewer audit requirements with appropriations (13 KSDs vs. 17 in WCF)<br>– If GFEBS is retained, working between GFEBS and LMP is manual and could lead to errors |

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Transparency: To customer into indirect costs, rates, and processes | ○ Complex cost recovery models that are difficult for customers to understand<br>○ Uses LMP instead of GFEBS; customers have less visibility into LMP | + Appropriations for indirect costs of MRTFB capabilities for DoD customers will continue, so customers will not demand visibility | – Requires two cost recovery models that reduces transparency and increases complexity (stabilized full cost recovery for non-MRTFB capabilities and nonstabilized appropriations for indirect costs for MRTFB capabilities)<br>– Multiple ERPs: Retains use of GFEBS to accept appropriations | – Multiple ERPs: Retains use of GFEBS to accept appropriations |
| Transparency: To HQDA into indirect costs, rates, and processes | ○ WCF has an oversight mechanism (ARRG) to improve transparency | + Oversight from DUSA-T&E and TRMC would continue for MRTFB capabilities<br>– Likely complicates manpower reporting since personnel would be paid out of WCF instead of appropriations | + Oversight from DUSA-T&E and TRMC would continue for capabilities that remain in MRTFB<br>– Dual-funding structure would greatly increase complexity and decrease transparency<br>– Likely complicates manpower reporting since personnel would be paid out of WCF instead of appropriations | + Oversight from the Deputy Assistant Secretary of the Army for Research and Technology and other stakeholders for mission appropriations would continue<br>○ Complexity is similar to current hybrid model (appropriations + reimbursables) but with ARRG oversight<br>– Likely complicates manpower reporting since personnel would be paid out of WCF instead of appropriations |
| Transparency: Into factors that drive mission costs | ○ WCF pricing incentivizes better information about how indirect costs contribute to mission | – Similar to status quo for MRTFB capabilities; ATEC lacks view of how indirect costs contribute to each test | – Similar to status quo for capabilities that stay in MRTFB; ATEC lacks view of how indirect costs contribute to each test | ○ Pricing in dual-funded model similar to pure WCF model, so similar requirements to understand drivers |
| Appropriateness | ○ Indirect recovery models encourage appropriate charges<br>– Profits/losses subsidize/hurt future customers | – Price stabilization means that MRTFB customers could pay less than actual direct costs | + MRTFB customers pay actual direct costs; no profit/loss | + Appropriations likely fund actual direct costs; no profit/loss |

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Compliance with laws, policies, and regulations | ○ Exempted from OUSD(C) guidance to minimize reimbursables<br>○ Increases (exempted) reimbursements since direct appropriations are eliminated | + Moves reimbursable work into WCF, which is exempted from OUSD(C) guidance to minimize reimbursables<br>○ Reduces (exempted) reimbursements for indirect costs relative to pure WCF<br>– Requires creating exception to WCF full cost recovery | – Reimbursements remain: Reimbursement for MRTFB recoveries are technically outside WCF<br>– Requires changing policies to allow removal of healthy MRTFB capabilities | + Appropriations for mission work remain fully compliant with OUSD(C) guidance to minimize reimbursables<br>+ Moves reimbursable work into WCF, which is exempted from OUSD(C) guidance to minimize reimbursables |
| One-time transition costs | ○ Major transition costs to convert to WCF | | – Could be additional need to realign ranges to consolidate MRTFB and non-MRTFB portions<br>– Requires uncertain improvements to better integrate GFEBS and LMP to allow costs to be funded initially by WCF | + Does not require the creation of customers for RDECOM's mission appropriations<br>– Requires uncertain improvements to better integrate GFEBS and LMP to allow costs to be funded initially by WCF |
| Ongoing transition costs | ○ Additional work for financial reporting | – ATEC would need to carefully monitor its labor prices and may need to adjust them below the stabilized price to avoid making a profit on MRTFB customers | – Increased costs to retain GFEBS capability<br>– Integration of GFEBS and LMP might result in higher costs (e.g., manual transactions, DFAS bills) depending on extent of improvements | – Increased costs to retain GFEBS capability<br>+ Avoids "middle-man" costs of creating customers for RDECOM's mission appropriations<br>– Integration of GFEBS and LMP might result in higher costs (e.g., manual transactions, DFAS bills) depending on extent of improvements |

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Price impacts on customers | ○ Customers pay WCF full cost recovery rates, including HQ, depreciation costs, and (possibly increased) charges from third parties (e.g., IMCOM and NETCOM) | + Customers continue to pay only direct costs for MRTFB capabilities<br>– Appropriations for indirect costs would need to fund any increases in WCF indirect costs<br>– Customer prices would increase to full cost recovery rates for non-MRTFB capabilities | + Customers continue to pay only direct costs for capabilities that stay in MRTFB<br>– Appropriations for indirect costs would need to fund any increases in WCF indirect costs<br>– Customer prices would increase to full cost recovery rates for capabilities moved out of MRTFB | – Appropriations for mission work would need to fund any increases in WCF indirect costs<br>– Customer prices for reimbursable work would increase to full cost recovery rates |
| Stability of customer costs | ○ Prices set in advance, leading to more predictability within a year<br>○ Prices could change more across years due to profits/losses | – Price stabilization for MRTFB capabilities is unlikely since profits would be an unallowable direct cost (similar to Navy, which charges actual costs) | – Price stabilization for capabilities remaining in MRTFB is unlikely since profits would be an unallowable direct cost (similar to Navy) | – Price stabilization is unlikely for costs outside the WCF |
| Customer incentives | ○ Charging fixed indirect costs to users of underutilized capabilities can lead to a “death spiral” as demand decreases | + MRTFB appropriations cover fixed costs as they do in current funding model, reducing underutilization<br>– Price increases to achieve full cost recovery for non-MRTFB capabilities could reduce customer demand | + Customers of capabilities that remain in the MRTFB would not pay for fixed costs<br>+ Capabilities removed from the MRTFB should be chosen that are not underutilized and can be sustained despite higher prices, avoiding “death spiral” issues<br>– Price increases to achieve full cost recovery for non-MRTFB capabilities could reduce customer demand | + Funds could be transferred from third parties that increase prices to retain buying power of RDECOM’s mission appropriations, resulting in no change in demand and increasing the stability of RDECOM demand<br>– Price increases to achieve full cost recovery for reimbursable work could reduce customer demand |
| Adaptability to changes in workload | ○ Ability to hire/lay off contractors to meet workload; some ability to hire civilians | – Reduced ability to hire relative to pure WCF since additional personnel increase burden on MRTFB institutional funds (e.g., to cover training and idle time) | – Reduced ability to hire (see left, but limited to capabilities that stay within the MRTFB) | ○ Unclear: Appropriations will still fund a significant share of the workforce, but WCF cash corpus can fund shortfalls in workload (albeit at a long-term cost) |

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Sustainability of low-demand capabilities | ○ Full cost recovery incentivizes divestment of underutilized capabilities | +MRTFB appropriations would continue to subsidize underutilized capabilities, as in status quo | + MRTFB appropriations would continue to subsidize underutilized capabilities, as in status quo<br>– Capabilities removed from MRTFB would be at greater risk of divestment | + Likely less pressure to divest of low-demand capabilities than in pure WCF alternative; RDECOM would retain mission appropriations, whereas customers may have discretion to use lower-priced suppliers |
| Supplier incentives | ○ WCF capital budget provides flexibility to fund investments and recover over time through depreciation<br>○ MRTFB capital costs remain funded outside WCF (FMR, vol. 2b [090104E1], as in status quo, hence less flexibility for ATEC to self-direct investments without HQDA/TRMC oversight) | ○ Similar to pure WCF for non-MRTFB capabilities and status quo for MRTFB capabilities | ○ MRTFB capital costs remain funded outside WCF, as in status quo<br>+Increased ability to invest/divest in capabilities removed from MRTFB<br>+Greater ability to invest in new capabilities outside MRTFB (does not create an MRTFB mortgage) | + Appropriated activities can continue to finance capital investments outside the WCF capital budget (FMR, vol. 2b [090107N2]), which increases RDECOM flexibility relative to pure WCF |
| Use Case #1: Lack of transparency and appropriateness of indirect rates | ○ Complex indirect rates improve appropriateness but decrease transparency<br>– Likely to lead to disagreements over indirect costs | + DoD MRTFB customers will not be impacted by complexity of rates, so disagreements over indirect costs are unlikely | + DoD MRTFB customers will not be impacted by complexity of rates, so disagreements over indirect costs are unlikely<br>– The creation of dual cost recovery models increases complexity and increases concerns over appropriateness | ○ Similar to pure WCF (and the status quo) |
| Use Case #2: Lack of transparency in customer-provider transactions | + Exempt from DoD guidance on minimizing reimbursables | + Similar to pure WCF | – Multiple ERPs reduce transparency<br>+ Less compliance with OUSD(C) guidance to minimize reimbursables, since MRTFB direct costs remain reimbursable | – Multiple ERPs reduce transparency<br>+ Mission appropriations are compliant with OUSD(C) guidance to minimize reimbursables (pure WCF requires creating new reimbursables, although they are exempt since they are in WCF) |

| | Pure WCF | ATEC: MRTRB Appropriations Within WCF | ATEC: Dual-Funded WCF | RDECOM: Dual-Funded WCF |
|---|---|---|---|---|
| Use Case #3: Contractor cost allocations artificially reduce reported disbursements | + Solves problem for ATEC: Contracts cite WCF corpus<br>○ N/A for RDECOM | ○ Same as pure WCF | ○ Contracts initially funded out of WCF, so same as pure WCF | ○ N/A for RDECOM |
| Use Case #4: Potential for inappropriate cost transferring | ○ No appropriations to cost transfer<br>○ High risk of third party (e.g., IMCOM) cost transfers | ○ Appropriations continue, but MRTFB policies prevent cost transfers | – Likely to raise concerns that costs are transferred to non-MRTFB to generate indirect recoveries | – Increased risk of cost transferring to/from mission appropriations |
| Use Case #5: Potential subsidies for non-Army customers | ○ Full cost recovery prevents non-Army subsidies | – Does not impact institutional appropriations, so MRTFB subsidies are the same as the status quo | – MRTFB capabilities continue to have subsidies (but reduces subsidies by transferring capabilities out of MRTFB into WCF) | ○ Similar cost recovery model prevents non-Army subsidies |

# Appendix O. Discussions and Visits

The tables below list the meetings and discussions the study team had throughout the study. We followed up these conversations with emails and data requests. In addition, the study team met with a number of the commands and stakeholders multiple times in In-Progress Review meetings and meetings with the sponsor.

**Table O.1. Visits and Discussions with RDECOM and AMC**

| Organization | Visit/Discussion | Dates |
|---|---|---|
| HQ AMC | Visits | 2017: May 23, Sept. 6, Dec. 7; 2018: March 8 |
| Aviation and Missile Research, Development, and Engineering Center (AMRDEC) | Visits/discussion | 2017: May 24, Aug. 17, Dec. 7 |
| Communications-Electronics Research, Development, and Engineering Center (CERDEC) | Visit | 2017: May 31 |
| Edgewood Chemical Biological Center (ECBC) | Visit at HQ RDECOM | 2017: May 31 |
| HQ RDECOM | Visits/frequent discussions | 2017: April 13, May 31, July 12 (visits) |
| Tank Automotive Research Development and Engineering Center (TARDEC) | Visit/discussion | 2017: May 5, Aug. 17 |

**Table O.2. Visits and Discussions with ATEC**

| Organization | Visit/Discussion | Dates |
|---|---|---|
| HQ ATEC | Visits/frequent discussions | 2017: April 13, June 1, July 12 (visits) |
| RTC | Visits | 2017: May 23, Dec. 6 |
| White Sands Test Center (WSTC) | Visit | 2017: Nov. 20 |
| Yuma Test Center (YTC) | Visit | 2017: Oct. 12 |

**Table O.3. Visits and Discussions with Army Customers and Organizations**

| Organization | Visit/Discussion | Dates |
|---|---|---|
| Army Audit Agency Headquarters | Visit | 2017: May 10 |
| Program Executive Office Command Control Communications–Tactical (PEO 3CT) | Visit | 2017: May 31 |
| Program Executive Office Aviation (PEO AVN) | Visit | 2017: Dec. 6 |
| Program Executive Office Combat Support and Combat Service Support (PEO CS&CSS) | Visit | 2017: May 25 |
| Program Executive Office Ground Combat Systems (PEO GCS) | Visit | 2017: May 25 |
| Program Executive Office Missiles and Space (PEO MS) | Visit | 2017: May 24 |
| Deputy Assistant Secretary of the Army (DASA) for Plans, Programs, and Resources DASA-PP&R | Visit | 2017: May 10 |
| Assistant Secretary of the Army (ASA) for Manpower and Reserve Affairs (M&RA) | Visit | 2017: Oct. 10 |
| Deputy Assistant Secretary of the Army Cost and Economics (DASA-C&E) | Visit | 2017: Sept. 19 |
| Deputy Assistant Secretary of the Army Financial Operations (DASA-FO) | Visits | 2017: May 9, Sept. 7, Oct. 30; 2018: Jan. 24 |
| Deputy Assistant Secretary of the Army for Research and Technology (DASA-RT) | Visit | 2017: June 6 |
| Deputy Undersecretary of the Army for Test and Evaluation (DUSA-T&E) | Visit | 2017: July 11 |
| Army Budget Office (ABO) | Visit | 2017: May 9 |

**Table O.4. Visits and Discussions Outside the Army**

| Organization | Visit/Discussion | Dates |
|---|---|---|
| Air Force Life Cycle Management Center (AFLCMC) | Discussion | 2017: Sept. 13 |
| Air Force Research Laboratory (AFRL) | Discussion | 2017: May 22 |
| Air Force Test Center | Visit | 2017: June 28 |
| Naval Air Warfare Center Weapons Division (Point Mugu, China Lake) | Visit | 2017: June 29 |
| Naval Surface Warfare Center Port Hueneme Division | Visit | 2017: June 29 |
| Office of the Assistant Secretary of the Navy Financial Management and Comptroller | Visit | 2017: June 6 |
| SPAWAR (Space and Naval Warfare Systems Command) Systems Center Pacific, | Discussion | 2017: June 26 |
| United States Army Corps of Engineers (USACE) Chief Financial Officer | Visit | 2017: June 6 |
| USACE Engineer Research and Development Center | Discussion | 2017: Aug. 10 |
| Office of the Under Secretary of Defense (Comptroller) OUSD(C) | Visit | 2017: Aug. 8 |
| Test Resource Management Center (TRMC) | Visit | 2017: Dec. 13 |
| Office of the Deputy Chief Management Officer | Visit | 2018: Jan. 11 |

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In 2016, the Office of the Under Secretary of Defense (Comptroller) (OUSD[C]) asked the military departments to minimize reimbursable civilian personnel costs to increase the transparency of accounting practices and improve auditability. The OUSD(C) guidance focuses on minimizing reimbursables because they make transactions between organizations less transparent and harder to trace. Along with financial and accounting considerations, the authors' assessment considered how the current reimbursement models and several alternative funding models at two Army commands—the U.S. Army Research, Development, and Engineering Command (RDECOM, renamed the Combat Capabilities Development Command [CCDC] in February 2019) and the U.S. Army Test and Evaluation Command (ATEC)—impact those commands, their customers, and the Army.

The authors have the following recommendations: that RDECOM and ATEC continue to operate within their current reimbursement models and that the commands pursue improvements to their current funding models that would allow them to address stakeholder financial and accounting concerns without the drawbacks and risks of alternative funding models.

This report should be of most interest to organizations in the Department of Defense that have been asked to minimize reimbursable civilian personnel costs. In addition, the report will be of general interest to government organizations seeking a better understanding of internal transfer pricing, including examples of how transfer pricing is used and the strengths and weaknesses of different mechanisms.

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